This Issue Exceeds 104,600 Copies

THE JOURNAL

OF THE

American Medical Association

Subscription, $8.00 | PUBLISHED WEEKLY | Single Copies, 25 Cents

VOLUME 117, No. 23

COPYRIGHT, 1941, BY AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street, Chicago, Ill.

DECEMBER 6, 1941

CONTENTS AND SUBJECT INDEX

Basis of Neurogenic Bladder. J. P. Evans, M.D., Cincinnati.....1927

Bladder Difficulties in Tabes. John L. Emmett, M.D., and J. B. Beare, M.D., Rochester, Minn. 1930

The Autonomous Neurogenic Bladder. Reed M. Nesbit, M.D., and William G. Gordon, M.D., Ann Arbor, Mich. 1935

Papers of Dr. Evans, Drs. Emmett and Beare and Drs. Nesbit and Gordon discussed by Drs. Herbst, Lewis, Landes, McLellan, Simons, Evans, Emmett and Gordon.

Sodium Fluoride Poisoning. Paul C. Hodges, M.D.; Omar John Fareed, M.D.; George Ruggy, M.D., Chicago, and Jack S. Chudnoff, M.D., Detroit 1938

Oxygen Therapy and Resuscitation. Ralph M. Tovell, M.D., and Joseph E. Remlinger Jr., M.D., Hartford, Conn. 1939

Discussed by Drs. Barach, Alexander, Knight and Tovell.

Tuberculosis Case Finding. T. L. Bliss, M.D., Akron, Ohio.....1944

Discussed by Dr. Plunkett.

Adiposogenital Dystrophy. Ralph H. Kunstadter, M.D., Chicago...1947

Hypothyroidism in Childhood. E. K. Shelton, M.D., Los Angeles..1948

Problems of Adolescence. Emil Novak, M.D., Baltimore.....1950

Cryptorchism. W. O. Thompson, M.D., and Norris J. Heckel, M.D., Chicago 1953

Papers of Dr. Kunstadter, Dr. Shelton, Dr. Novak and Drs. Thompson and Heckel discussed by Drs. Elterich, McCullagh, Turner, Shelton, Kennedy, Jacobsen, Novak, Kunstadter and Thompson.

Unity in Health Administration. J. W. Mountin, M.D., Washington, D. C. 1958

Discussed by Drs. Markwith, Holle, Ferrell, Baker and Mountin.

Poliomyelitis. Edward A. Piszczek, M.D.; H. J. Shaughnessy, Ph.D.; Joseph Zichis, Ph.D., and Sidney O. Levinson, M.D., Chicago..1962

Gasoline Intoxication. Willard Machle, M.D., Cincinnati.....1965

CLINICAL NOTES

Western Equine Encephalitis. J. A. Wheeler, M.D., Newton, Kan. 1972

"Athlete's Foot." Edward Francis, M.D., Washington, D. C. 1973

THERAPEUTICS

The Therapy of the Cook County Hospital: Meningitis. Archibald L. Hoyne, M.D., Chicago....1973

COUNCIL ON PHYSICAL THERAPY 1978

EDITORIALS

Poliomyelitis 1980

Congress on Industrial Health..1981

CURRENT COMMENT

Appropriations for Hospitals...1982

Procurement and Assignment Service for Physicians, Dentists and Veterinarians 1982

Ovine Venereal Ultravirus.....1982

(Subject Index on next page)

MEDICAL PREPAREDNESS

Procurement and Assignment Service for Physicians, Dentists and Veterinarians 1983

Additional List of Priorities Among Health Supplies.....1988

Army Reserve Officers Ordered to Active Duty.....1989

ORGANIZATION SECTION 1990

A.M.A. CONVENTION ATLANTIC CITY JUNE 8-12, 1942

LADD & GROSS' ABDOMINAL SURGERY of INFANCY & CHILDHOOD

New Book!—The immediate success of this *new* book has clearly demonstrated the special need for just such a work. Surgeons, Pediatricians and General Practitioners alike are finding here the very data they want on diagnosing and treating abdominal surgical diseases of children.

Yes, this new book is *much more* than a work on surgical technic. It covers all *clinical* aspects, such as incidence; etiology; pathology; physical, x-ray and laboratory examination; clinical features; nonoperative treatments; surgical technic; preoperative and postoperative care. Diseases and conditions of special importance are given particular attention.

The *614 illustrations* on 268 figures include picturization on full pages of *37 basic operations*, showing step-by-step technic.

This *new* book was written by two distinguished authorities and is based on 25 years' experience at the Children's Hospital of Boston.

By WILLIAM E. LADD, M.D., F.A.C.S., William E. Ladd Professor of Child Surgery, Harvard Medical School; and ROBERT E. GROSS, M.D., Associate in Surgery, Harvard Medical School. 455 pages, 6¾" x 10", with 614 illustrations on 268 figures. $10.00.

See Also SAUNDERS ADVERTISEMENT on Page 3

SUBJECT INDEX TO THIS ISSUE

The letters used to explain in which department the matter indexed appears are as follows: The Star (*) indicates an Original Article; "ab," abstract; "E," Editorial; "C," Correspondence; "Ml," Medicolegal; "ME," Medical Economics; "OS," Organization Section; "SS," Student Section.

A. M. A. Congress on Industrial Health E-1981; OS-1990
exhibits from headquarters....OS-1991
resolution on Procurement and Assignment Service 1983
Abortion racket, survey, New York....1993
recurrent, corpus luteum plus vitamine E for ab-2013
Acid, ascorbic, and wound healing....ab-2006
Adiposogenital dystrophy *1947
Adolescence, chlorosis in....ab-2009
gynecologic problems *1950
Agglutination-lysis test in Weil's disease.C-2001
Allergy, desensitization to horse dander...2017
Amenorrhea in adolescence....*1951
American Clinical and Climatological Association 1995
Orthoptic Council examinations for technicians 1994
Society of Tropical Medicine....1994; 1995
Amphetamine sulfate in fatigue....ab-2011
sulfate in obesity....ab-2010
Ampulla of Vater, cancer of....ab-2006
Anemia, erythroblastic, splenectomy for.ab-2013
hemolytic, symptomatic ab-2005
hypochromic: chlorosis ab-2009
tropical, liver extract for....ab-2012
Angina Pectoris, symptoms in hypothyroidism ab-2012
Art, Los Angeles Society....1992
Arteries, coronary calcification in infant ab-2013
Assassin bugs role in encephalitis....*1972
Association News 1990
Asthma, desensitization to horse dander....2017
Athlete's foot, phenol-camphor formula for.*1973
Bacterium necrophorum role in colitis...ab-2006
Bayne-Jones, Stanhope, Hektoen Lecture by.1992
Bladder, neurogenic autonomous, surgical treatment *1935
neurogenic, in tabetic, transurethral resection for *1930
neurogenic, physiologic basis....*1927
Blood amino acids in hematemesis....ab-2012
autotransfusion to prevent apoplexy...ab-2014
picture in sporadic grip....ab-2014
prothrombin level in surgical jaundice and subacute yellow atrophy....ab-2007
specific gravity of, determination....2018
transfusion of, and substitutes....C-2000
Board Examinations 2002
Bones, skeletal sclerosis in sodium fluoride poisoning *1938
Book Notices 2015
Books Received ....Adv. Page 38
Brain concussion and contusion....ab-2014
hemorrhage, autotransfusion to prevent.ab-2014
Brazilian Board of Ophthalmology....1995
Breast abnormalities in adolescents....*1953
giant intracanalicular fibroadenoma....ab-2007
Bureau of Legal Medicine and Legislation..2003
Camphor-phenol for "athlete's foot"....*1973
Cancer fellowship, applications for....1995
Cardiovascular system, oxygen lack affects ab-2007
Cerebrospinal Fluid, subdural hygroma..ab-2006
Chlorosis ab-2009
Colds, comprehensive study....1992
Colitis, ulcerative chronic, Bacterium necrophorum etiologic role....ab-2006
Conjunctivitis from paredrine hydrobromide as mydriatic ab-2006
Corpus Luteum therapy in recurrent abortion ab-2013
Correspondence 2000
Council on Physical Therapy....1978
Crum, Heil E., Etherator....1992
Deaths 1998
DeKleine, William, retires from Red Cross.1995
Dermatitis from paredrine hydrobromide.ab-2006
Diabetes Mellitus not from blow on head...2018
Diagnosis, nothing physically the matter..C-2000
Dichlorobenzene, toxicity 2017
Diet, healing of dental caries....C-2001
Diphtheria antitoxin ab-2011
Drunkenness; blood tests; fact of refusal to submit to Ml-2004
Duerst, J. U., on causes of goiter....1997
Dysmenorrhea in adolescent....*1950
Dystrophy, adiposogenital *1947
Ear, outer, congenital malformation....2018
Encephalitis, equine Western, in Kansas..*1972
Endometrioma of ureter....ab-2008
Epidermophytosis interdigitale, phenol-camphor formula for....*1973
Etherator, Crum guilty....1992
European War, American gift of surgical instruments 1996
Germany violates care of sick and wounded 1996
hospital infection of wounds....ab-2012
International Conference of Scientists...1996
medical aid to Russia and Norway....1988
Fatigue, amphetamine sulfate in....ab-2011
Feces, poliomyelitis virus in....*1962
Fees, payment and prepayment plans....C-1911
Fibroadenoma, giant intracanalicular....ab-2007
Finney-Howell Research Foundation cancer fellowships 1995
Fluoride, sodium fluoride poisoning....*1938
Foot, athlete's, phenol-camphor formula for.*1973
Foreign Letters 1996
Friedenwald, H., de Schweinitz Lecture by.1994
Gangrene, gas ab-2011
Gasoline intoxication *1965
Von Glahn, William C., appointed....1993
Glycosuria, blow on head cause?....2018
Goiter, causes of, Duerst's study....1997
Gonadotropins, chorionic, for cryptorchism.*1953
Gonads, hypogonadism in adiposogenital dystrophy *1947
Gonorrhea, in Negro sharecroppers....C-2000
Guthrie, Wilson G., physical director....1993
Gynecology, problems of adolescence....*1950
Hair excessive in adolescents....*1953
Head, injury cause diabetes?....2018
Health administration, plea for state unity.*1958
HEALTH AND THE DOCTORS....C-1911
NYA health program resumed, O....1994
of Negro sharecroppers....C-2000
Heart, electrocardiogram in selectees....ab-2011
Hektoen Lecture by Dr. Bayne-Jones....1992
Helium production increased....1988
Hematemesis, blood amino acids in....ab-2012
Horse dander, desensitization to....2017
Hospitals, building by U. S. government.E-1982
charitable: pay patients; liability to..Ml-2003
Cook County, therapy of....*1973
cooperate in clinic, Lincoln....1993
infection of wounds, reduction of....ab-2012
release "socially safe" mental patients..1992
4-Hydroxy Amphetamine, dermatitis and conjunctivitis from paredrine....ab-2006
Hygroma, subdural ab-2006
Hypodermic equipment, sterilization and care 2017
Hypothyroidism, anginal symptoms in...ab-2012
in childhood *1948
Industrial gasoline intoxication....*1965
diseases, lectures on, New York....1993
health, A. M. A. Congress on.E-1981; OS-1990
health of Negro sharecroppers....C-2000
synthetic resins 2018
Infant, coronary calcification and thrombosis in ab-2013
Influenza, blood picture in....ab-2014
meningitis ab-2013
trochlear neuritis after....2018
Jaundice, surgical ab-2007
Weil's disease....ab-2005; ab-2010
Weil's disease, animal inoculation or agglutination-lysis test to diagnose....C-2001
Kenny, Sister, poliomyelitis treatment...E-1980
Liver extract for tropical anemia....ab-2012
fatty infiltration and degeneration in pancreas cancer ab-2006
subacute yellow atrophy....ab-2007
Lymphadenitis, tuberculous cervical, x-ray therapy ab-2009
Malpractice: diagnosis; mistake in....Ml-2004
intern; liability for negligence of....Ml-2003
Man in danger of extinction....1996
Medical and Surgical Relief Committee of America 1988
Medical Education, graduate lectures, Iowa.1992
in Mexico 1995
Medical Examinations and Licensure....2002
Medical Jurisprudence, Kansas cooperating committees 1993
Medical Preparedness 1983
civilian defense organization....1988
officers ordered to active duty....1989
OPM priorities among medical supplies..1988
Procurement and Assignment Service.... ....E-1982; 1983
tuberculosis in recruits, N. Y....ab-2010
value of electrocardiography ab-2011
Medical Supplies, OPM priorities....1988
Medicolegal Abstracts 2003
Meetings, Coming Meetings....2004
Meneghello Rivera, J., pediatric scholarship to 1995
Meninges, subdural hygroma....ab-2006
Meningitis, epidemic, sulfanilamide for..ab-2013
influenzal ab-2013
therapy at Cook County Hospital....*1973
Menstruation, functional bleeding in girls.*1952
Mosquitoes, role in encephalitis....*1972
Moth exterminant: dichlorobenzene....2017
Mydriatic, dermatitis and conjunctivitis from ab-2006
NYA health program resumed, Ohio....1994
Negro sharecroppers, health of....C-2000
Neuritis, trochlear, post influenzal....2018
Neurosis, "nothing physically the matter".C-2000
News 1992
Nursing care in meningitis....*1977
Obesity, adiposogenital dystrophy....*1947
in adolescent *1952
treatment, amphetamine sulfate....ab-2010
treatment, Werner-Weir 2017
Ophthalmology, Brazilian Board....1995
Organization Section 1990
Orthoptic technicians, examinations for....1994
Oxygen lack, cardiovascular effect....ab-2007
therapy *1939
Pancreas, cancer ab-2006
Peptic Ulcer, bleeding, partial gastrectomy for ab-2005
Phagocytes, effect of gas gangrene....ab-2011
Pharmacopeia, U. S., Convention....1995
Phenol-camphor for "athlete's foot"....*1973
Physical Examinations: court's right to require Ml-2003
Physicians, art exhibit; flower show, Los Angeles 1992
ordered to active duty....1989
Procurement and Assignment Service.... ....E-1982; 1983
Pituitary, adiposogenital dystrophy....*1947
posterior, extract to reduce weight....2017
Plaskon, synthetic resins....2018
Poliomyelitis in pregnancy....ab-2009
in Chicago western suburbs....*1962
National Foundation annual meeting....1995
physiologic anatomy E-1980
Pregnancy, poliomyelitis in....ab-2009
Prizes, Ashford, to Dr. Rozeboom....1994
Associated Grocery Manufacturers....1994
Procurement and Assignment Services.... ....E-1982; 1983
Queries and Minor Notes....2017
Radio, health campaign Listen America....1994
Red Cross, Dr. DeKleine retires from....1995
Resins, synthetic, effects....2018
Resuscitation, oxygen therapy....*1939
Roentgen therapy in lymphadenitis....ab-2009
Rozeboom, L. E., Ashford Award to....1994
de Schweinitz Lecture by Dr. Friedenwald.1994
Scientists, International Conference....1996
Sharecroppers, health of....C-2000
Sheep, venereal infection of....E-1982
Society Proceedings 2004
Sodium fluoride poisoning from water....*1938
Sphincter Muscles, vesical, role in neurogenic bladder *1927
Splenectomy for erythroblastic anemia..ab-2013
State Board Examinations....2002
Sterilization of hypodermic equipment....2017
Sulfanilamide, effect on gas gangrene...ab-2011
in meningitis *1976; ab-2013
Tabes Dorsalis, bladder difficulties....*1930
Teeth caries, dietary healing....C-2001
Tendovaginitis, x-rays and immobilization for ab-2014
Testis, undescended, chorionic gonadotropins for *1953
Therapy of Cook County Hospital....*1973
Thorax, chest diseases....1994
Thrombosis, coronary, in infant....ab-2013
Thyroid, desiccated, to reduce weight....2017
Tissue, connective, effect of gas gangrene.ab-2011
Tonics and Sedatives....Adv. Page 32
Trauma and diabetes....2018
Tropical Medicine, American Society of...1995
Ashford award to Dr. Rozeboom....1994
School of 1994
Tuberculosis case finding....*1944
in selective service men....ab-2010
sanatorium conference, N. Y....1993
Ureter, endometrioma ab-2008
Urination disorders in tabetic....*1930; *1932
neurogenic bladder and....*1927
Venereal infection of sheep....E-1982
Vitamin award to Dr. Williams....1994
E for threatening abortion....ab-2013
K therapy in surgical jaundice and subacute yellow atrophy....ab-2007
Water supply, fluoride poisoning from....*1938
Westman, R. T., epidemiology consultant..1992
Williams, R. R., vitamin award to....1994
Woman's Auxiliary 1991
Wound healing and ascorbic acid....ab-2006
hospital infection, reduction of....ab-2012

THE JOURNAL of the American Medical Association is published weekly by the American Medical Association, 535 North Dearborn Street, Chicago, Ill. Subscription price, $8.00 a year. 25c a copy. Canadian $9.50. Foreign $12.00. Entered as second class matter June 25, 1885, at the Postoffice at Chicago, Ill., under Act of March 3, 1879.

BOOK BUYING SIMPLIFIED
We supply new and standard medical works of all publishers
ONE ORDER—ONE REMITTANCE
GET OUR LATEST BULLETIN
CHICAGO MEDICAL BOOK CO. 438 S. Honore St. CHICAGO

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 117, NO. 23 — COPYRIGHT, 1941, BY AMERICAN MEDICAL ASSOCIATION — CHICAGO, ILLINOIS — DECEMBER 6, 1941

THE PHYSIOLOGIC BASIS OF THE NEUROGENIC BLADDER

JOSEPH P. EVANS, M.D.

CINCINNATI

The propriety of presenting yet another paper dealing with the physiology of micturition might well be questioned since the literature on the subject has become so voluminous as to be repetitious. The presentation of significant new data or the pointing out of new problems would be adequate justification. In this instance, however, I shall attempt so to strip the subject of its physiologic and neurologic complexities as to provide a useful working concept of bladder activity which the practitioner can utilize in handling his everyday problems. The authoritative work of Denny-Brown and Robertson [1] and of Langworthy, Kolb and Lewis [2] may be referred to for detailed presentation and analysis of the experimental and clinical evidence.

There are several basic anatomic and physiologic facts that are a prerequisite to an understanding of the problem. Briefly they are as follows: The bladder is made up of smooth or involuntary musculature. The detrusor muscle, which expels fluid from the bladder, merges insensibly into the musculature of the bladder neck, which forms the internal sphincter. The two muscles—detrusor and sphincter—receive their nerve supply by way of the pelvic nerves, derived from the second and third sacral segments, and their common nerve supply is reflected by the fact that they act in unison, the sphincter relaxing as the detrusor contracts, and vice versa.

Such coordinated activity makes implicit a neural organization. Sensory data on the state of muscle stretch must be carried to the central nervous system, and motor activity must be initiated over the motor pathways. A graphic concept of such activity [3] may easily be obtained by a study of the passage of the nerve impulse upward toward the central nervous system from the musculature of the bladder. One may sample in the experimental animal the nervous activity in the sensory fiber by leading its cut end across electrodes connected with the input of an amplifying system which "boosts" the strength of the action current sufficiently that it activates a recording oscillograph (fig. 1). Resting activity shows a rather low rate of discharge over the nerve fiber, but when the bladder wall is stretched by the addition of fluid the muscle bundles supplied by the nerve fiber in question become stretched, and the stretch is signaled to the central nervous system by an increased rate of discharge up the nerve fiber (fig. 2). Testing the motor fiber in a similar fashion (fig. 5), one finds that the activity therein changes from one that keeps the muscle of the bladder wall at a level of moderate tension to one which resists the addition of an increment of fluid or which takes part in a concerted effort actually to expel all fluid and thereby to evacuate the bladder. A simultaneous increase in the discharge to the internal sphincter apparently inhibits an inherent tone in the internal sphincter and results in its relaxation if the detrusor contraction is a powerful one (fig. 6).

The sensory fibers bear to the sacral cord segments the impulses indicating the state of stretch of the detrusor and sphincter musculature; the motor fibers bear to the bladder and its neck—that is the internal sphincter—the impulses dictating the motor response. These simple anatomic facts are depicted in figure 4. It should be borne in mind that cells of the anterior horn which give rise to the motor fibers belong to the autonomic or parasympathetic system, as would be expected, since they are destined to supply involuntary muscle.

The problem is simplified if one realizes that the bladder is able to function effectively without participation of the external sphincter. The latter structure serves an auxiliary purpose; it is made up of striated or "voluntary" muscle and its central motor connections also lie in the second and third sacral segments, but the cells of the anterior horn lie in that portion of the gray matter which has to do with the somatic—as opposed to the parasympathetic—system, thus making these centers subject to a greater degree to the control of the will.

The external sphincter is at most times kept in a constant state of "tone" or closure by a steady stream of nerve impulses transmitted from these centers downward to the sphincter by way of the pudendal nerves. Relaxation of the sphincter occurs only when these impulses cease to arrive at the muscle; at such times urine can pass by the sphincter, the passage being abruptly cut off when a resumption of the nervous discharge occurs. The activity over the pudendal nerve is well represented in figure 3. Relaxation of the sphincter, accomplished by interruption of the nervous discharge, can be brought about only by a reflex dependent on contraction of the bladder detrusor, but closure of the sphincter—accomplished by a resumption of the nervous discharge—is under direct control of the will (fig. 8).

It is now well recognized that the nervous control of the bladder is not centered in a particular part of the central nervous system; rather supervisory centers are

From the Department of Surgery and the Laboratory of Neuropathology, University of Cincinnati College of Medicine.

Read before the Section on Urology at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 4, 1941.

1. Denny-Brown, D., and Robertson, E. G.: On the Physiology of Micturition, Brain **56**: 149 (July) 1933; The State of the Bladder and Its Sphincters in Complete Transverse Lesions of the Spinal Cord and Cauda Equina, ibid. **56**: 397 (Dec.) 1933.

2. Langworthy, O. R.; Kolb, L. C., and Lewis, L. G.: Physiology of Micturition, Baltimore, Williams & Wilkins Company, 1940.

3. Evans, J. P.: Observations on the Nerves of Supply to the Bladder and Urethra of the Cat, with a Study of Their Action Potentials, J. Physiol. **86**: 396 (May 4) 1936.

located at several points. An analogy might be made to the airfighter squadrons of present day warfare, except that the neurologist refers to "levels" of control. The isolated bladder musculature, whose fibers are unable to act in concert, may be likened to the individual airdromes deprived of all but the most primitive means of communication. The sacral levels whose function it is to coordinate the activity of the bladder musculature by sensory and motor impulses may be compared to the aerial sector control center, to which information filters

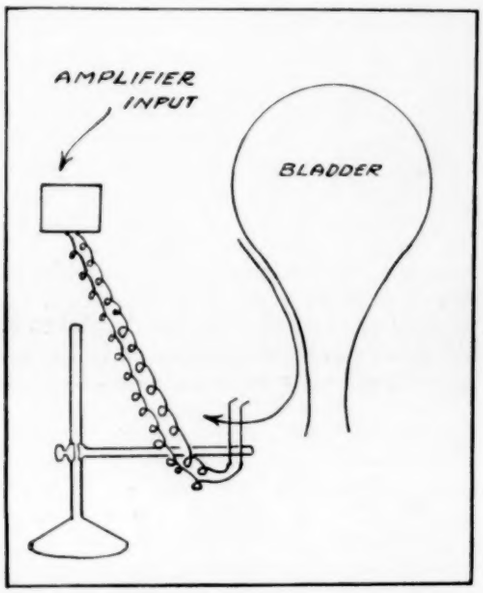


Fig. 1.—Arrangement of dissection to test sensory activity in the nerve supply of the bladder.

and from which commands are forwarded. The midbrain levels which secure a more complete bladder function and aid in coordination with other bodily activities may be likened to the group control station, and the cerebral centers obviously are comparable to fighter command headquarters.

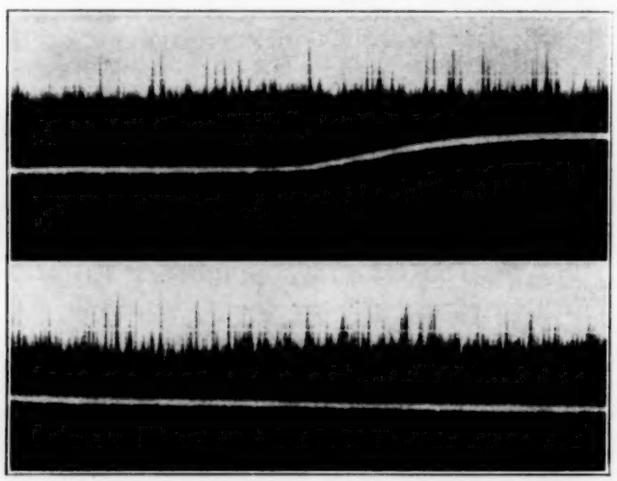


Fig. 2.—Oscillographic record of increased sensory discharge occurring when sudden distention of the bladder is artificially produced.

The lowest level of bladder activity is, then, the bladder which is isolated from its central nervous system connections. This is the type of activity which one may expect when the bladder is separated from the sacral levels of the cord, as in a complete lesion of the cauda equina, or when there is interruption of the posterior (sensory) root fibers, as in tabes dorsalis, or when there is actual destruction of the conus medullaris—the terminal portion of the spinal cord containing

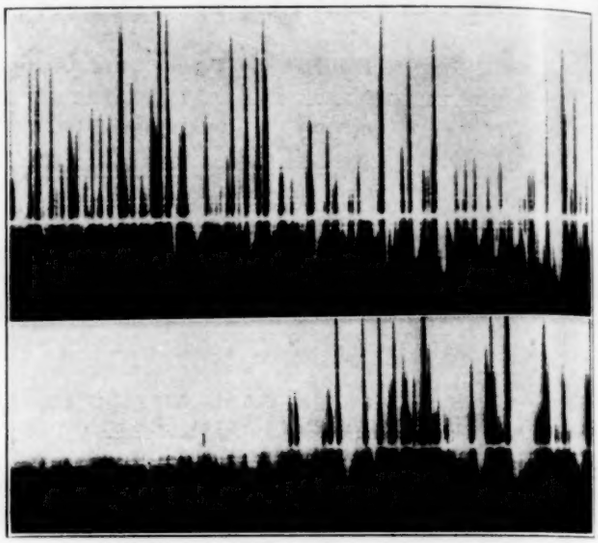


Fig. 3.—Upper record shows continuous discharge over pudendal nerve which keeps the external sphincter shut. Lower record shows discharge in abeyance, then sudden resumption of activity coincident with contraction of external sphincter.

the sacral segments (fig. 8). In these instances the innervation of the external sphincter is lost, and since the sphincter is then toneless, as are the other skeletal muscles supplied by the same segments, it no longer

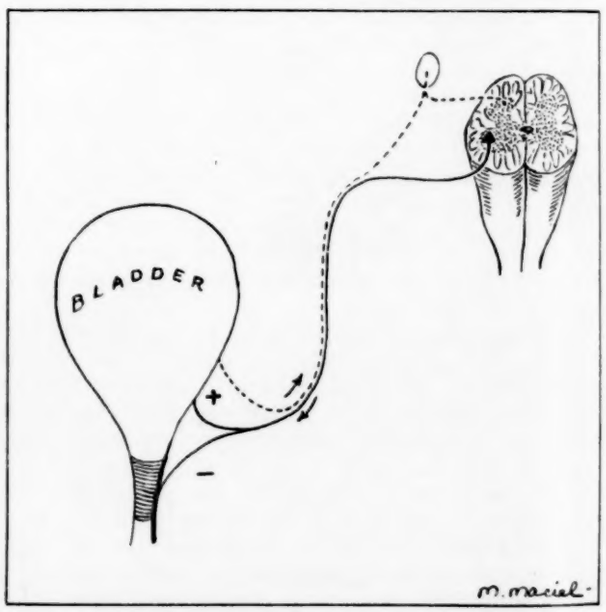


Fig. 4.—Relationship of sacral segments to the bladder. Dotted line represents sensory pathway and posterior root ganglion and solid line represents motor pathway. Plus sign indicates positive effect producing contraction of detrusor. Minus sign indicates negative effect resulting in relaxation of sphincter.

functions and offers no resistance to the passage of urine. Neural organization is therefore limited to the pelvic and intramural plexuses, which contain, in a fashion characteristic of the autonomic nervous system, ganglionic clusters possessed of independent activity. Under these circumstances one can expect only a relatively incompetent coordination of bladder muscle

activity, devoid of effective integration—the isolated airdromes of our analogy.

One may now concern oneself with the next higher level of neurologic function—that which involves reflex activity through the sacral cord. It is at this level that one first deals with spinal reflexes. Through the mediation of the cord segments sensory impulses are coordinated and motor activity is regulated. Thus a spinal transection above the sacral level gives rise to what has been termed the spinal cord bladder. If the severance

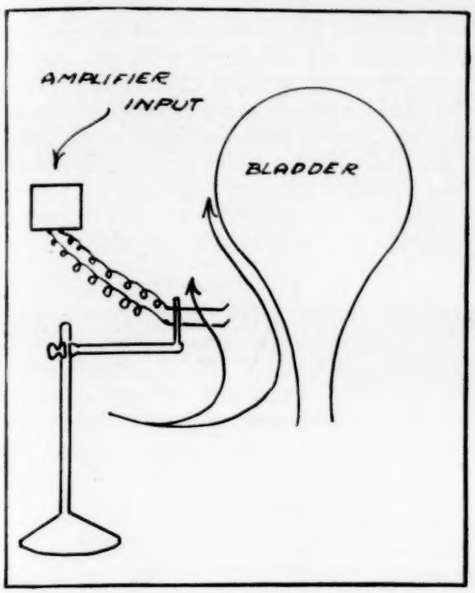


Fig. 5.—Arrangement of dissection to test motor activity in the nerve supply of the bladder.

is sudden, there occurs a period of "spinal shock" when all nervous activity below the lesion is in abeyance. Under these circumstances the external sphincter is thrown out of function, the detrusor does not contract and no urine is forced past the bladder neck, which either possesses an inherent tone despite the presence of neural shock or, as believed by some authors, offers a moderate mechanical obstruction to the fluid in the absence of detrusor contraction. The bladder distends inertly until the pressure within the distended relaxed viscus rises sufficiently to force fluid past the mildly resisting internal sphincter.

With the recovery from spinal shock, however, there begins to occur the passage of sensory and motor nerve impulses over the neural pathways. These awake the musculature to activity and waves of contraction occur in the bladder wall. With the onset of a strong contraction of the bladder the internal sphincter relaxes, as does the external sphincter in turn, and urination results. As is true of skeletal muscles in lesions of the transverse cord, there develops a "contracture" of the involuntary muscle of the bladder so that in time the bladder becomes of smaller size, and the reduced capacity results, of course, in more frequent voiding. Furthermore, because the cord bladder falls short of complete neural organization, the emptying is not completely efficient and there is often a residual amount of urine. Such a bladder is of course devoid of all conscious representation, so that its activity is carried out on a purely spinal reflex level, without sensory or motor control from the supraspinal levels of neurologic activity. The bladder situation in this analogy is like that of fighter units under the command of the sector control station, better integrated but only partially efficient.

Extensive studies in lower animals have shown that there are centers in the midbrain which exert an influence over micturition, and when connections with midbrain levels are maintained the micturition mechanism, though still carried out at subconscious levels, is more smoothly coordinated and voiding is done efficiently. In analogy a group control station is now in command and the situation can be dealt with more effectively.

Finally, there are "centers," located in the paracentral lobule (fig. 7), which represent the highest levels of

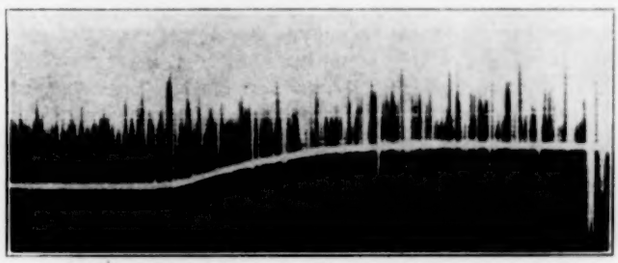


Fig. 6.—Oscillographic record of increased motor discharge occurring when sudden distention of the bladder is artificially produced.

neural organization for micturition. Destructive or irritative lesions in these regions result in retention or incontinence, and frequently urinary disturbances in persons with cerebral lesions represent difficulties due not to mental disturbance but to direct involvement of nervous control of bladder activity. In analogy, there is here represented the fighter command headquarters.

No reference has been made up to this point of the role of the sympathetic nervous system. There is evidence, sometimes equivocal, that in certain abnormal states section of the presacral nerves, which send fibers to the urinary bladder, facilitates micturition. But the old concept of the parasympathetic system as being the expellant mechanism, opposed by a "holding" mechanism innervated by the sympathetic system, is no longer generally held. It is probably better to recognize the

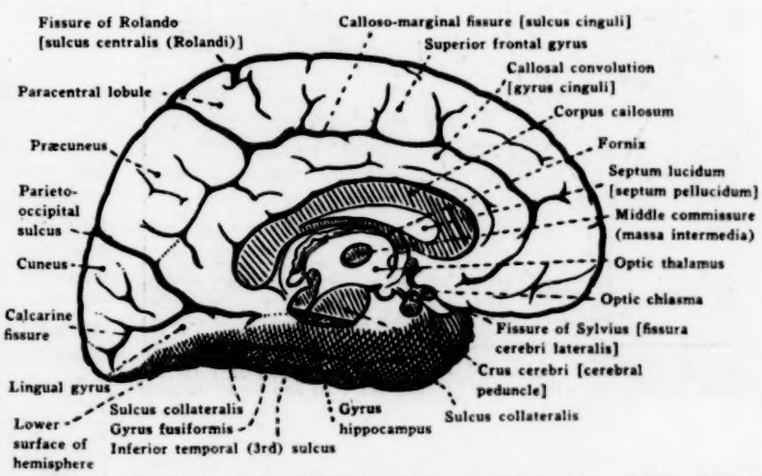


Fig. 7.—Mesial aspect of hemisphere, showing paracentral lobule. (From Pauchet and Dupret: Pocket Atlas of Anatomy.)

sympathetic supply to the bladder as dealing with activity of the trigon and of the ureter, with vasomotor control and with sexual function (ejaculation). This

rather arbitrary elimination of the sympathetic nervous system from a role in micturition is probably justifiable pending the production of more convincing evidence of its importance, and for the practical purposes at hand it simplifies consideration greatly.

In recapitulation one may descend the various levels of function. Beginning at the highest level one has the fully integrated mechanism of micturition subject to inhibition by the person who can suppress the desire to void for variable periods of time or who can intitiate micturition at will. In passing, it would be well to mention that McGraw [4] points out in a paper on maturation of neural activity in the child that bladder control may be gained for a time and then be lost as other neural mechanisms develop and demand attention and displace the dominance recently gained. Such fluctuation in control may go on for some time. The matter is of practical importance for it suggests a physiologic basis for the sometimes distressing periods of enuresis through which children pass. She suggests that in the normal child control will develop when the neural organization reaches a sufficiently well developed level and that there is little that can be done to hasten this organization.

At the next lower level of function, which may roughly be termed the midbrain level, micturition occurs subconsciously and without the exercise of the will but may still be very well coordinated.

At the spinal level, following the recovery from shock, a fairly well coordinated activity develops in time. The tone of the muscle is increased in typical cases, the capacity of the bladder is smaller than normal and the emptying is generally not complete. Such bladders are influenced by cutaneous stimuli reaching the central nervous system in the isolated segment, and they affect

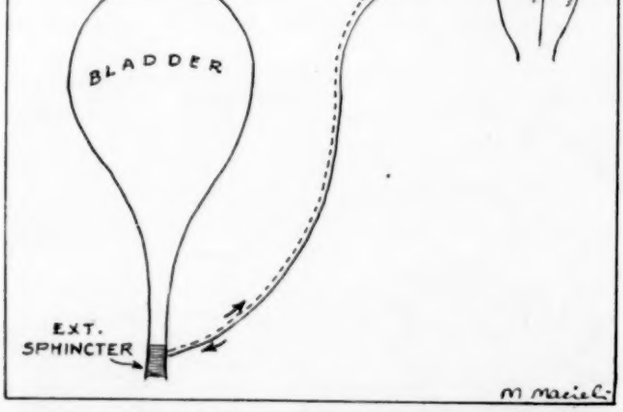


Fig. 8.—Relationship of sacral segments to the external sphincter. Dottled line represents the sensory pathway and solid line the motor pathway.

the local reflex arc. This fact explains the emptying of the bladder that may be brought about by penile manipulation preceding catheterization, and likewise the inhibition of micturition by cutaneous stimuli derived from areas less directly related to the micturition arc.

4. McGraw, Myrtle B.: Neural Maturation as Exemplified in Achievement of Bladder Control, J. Pediat. **16:** 580 (May) 1940.

Then there is the isolated or autonomous bladder that displays an ill coordinated activity which is devoid of spinal reflex implications because of being isolated from the spinal cord.

There are certain practical considerations which I should like to stress:

1. The bladder musculature should never be allowed to stretch unduly. To do so means stretched muscle fibers, which like those of skeletal muscle are then less well able to respond to nervous activity.

2. A stretched bladder wall is more prone to infection. Infection followed by fibrosis leads to impairment of bladder function and interferes with the resumption of motor activity when nervous control is restored.

3. The bladder musculature is subject to and can be benefited by passive exercise just as in the case of skeletal muscle. Such passive exercise is accomplished by the employment of tidal drainage as long used by Hinman and as popularized by the work of Munro.[5] Tidal drainage is sound bladder physiology.

BLADDER DIFFICULTIES OF TABETIC PATIENTS

WITH SPECIAL REFERENCE TO TREATMENT BY TRANSURETHRAL RESECTION

JOHN L. EMMETT, M.D.
AND
J. BYRON BEARE, M.D.
Fellow in Urology, Mayo Foundation
ROCHESTER, MINN.

In previous articles one of us [1] has emphasized that in most cases of vesical atony it is extremely difficult and often impossible to state with accuracy whether the vesical dysfunction is a result of primary neurogenic atony, neurogenic atony complicated by obstruction of the vesical neck or myogenic atony secondary to obstruction of the vesical neck. By means of illustrative cases in these previous papers it was shown that even though the most careful cystoscopic, cystometric and neurologic examinations are performed they often fail entirely to supply the correct answer to this diagnostic problem. It was brought out also that the etiologic differentiation of these conditions may be relatively unimportant as far as treatment is concerned.

This subject assumes considerable importance when patients who are suffering from tabes dorsalis are concerned. The classic description of the pathologic changes found in this disease are "chronic inflammation of the posterior spinal ganglia, posterior nerve roots between the ganglia and the spinal cord and to some extent the meninges, degeneration of the columns of Goll and Burdach, primary atrophy of the optic nerve and interruption of the pathway which has to do with the ciliary reflex." [2] The vesical symptoms initiated by tabes dorsalis are, therefore, those that result from damage to the sensory roots of the sacral nerves which form the sensory component of the reflex arc that serves for micturition.

5. Munro, Donald: The Cord Bladder: Its Definition, Treatment and Prognosis When Associated with Spinal Cord Injury, J. Urol. **36:** 710 (Dec.) 1936.

From the Section on Urology, Mayo Clinic.
Read before the Section on Urology at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 4, 1941.

1. Emmett, J. L.: "Tabetic Cord Bladder": Newer Concepts in Diagnosis and Treatment, Proc. Staff Meet., Mayo Clin. **15:** 91-96 (Feb. 7) 1940; Urinary Retention from Imbalance of Detrusor and Vesical Neck: Treatment by Transurethral Resection, J. Urol. **43:** 692-704 (May) 1940.

2. Wechsler, I. S.: A Textbook of Clinical Neurology, Philadelphia, W. B. Saunders Company, 1927, p. 117.

Attempts to present a logical anatomic and physiologic reason for the vesical symptoms found in this disease have resulted in various explanations based on theories as well as facts. It is our aim in this paper to avoid theoretical discussion and to confine ourselves to the statement of clinical observations which we feel should be helpful to the physician caring for these unfortunate patients. Nevertheless, in order to present the subject in an intelligible manner it will be necessary to comment briefly on the more common theories which are currently accepted.

Dees and Langworthy [3] have shown experimentally that section of the posterior sacral roots in cats results in an enlargement of the lumen of the bladder accompanied by urinary retention and incontinence. They found that some of this vesical distention could be prevented by passively emptying the bladder by manual pressure or by drainage with an indwelling urethral catheter. Jacobson,[4] working at the Mayo Clinic, has obtained the same results on dogs. The experimental lesions produced by these investigators simulate the clinical lesion of tabes dorsalis.

On reading articles on this subject, it is necessary to distinguish carefully between statements based on fact and statements based on theory. For instance, that the urinary bladder dilates and urinary retention and incontinence occur after interruption of the sensory part of the reflex arc are facts. The explanation as to why this reaction occurs is theory. One theory is that, because the reflex arc is interrupted, the stimulus to initiate micturition does not get through to the motor side of the reflex arc. Also there is no sensation of wanting to urinate and as a result of these factors the bladder becomes distended. The result of distention is a weakening of the muscle fibers of the detrusor and thus a vicious cycle is established. Some workers in the field [5] suggest that in this condition the external sphincter may become hypertonic and act as an obstruction to the outflow of urine. Sufficient proof of this statement is not available. Also the subject of incontinence in this disease has elicited much speculation and some rather loose statements. In the literature have appeared such statements as "the incontinence is probably a true overflow incontinence in most cases." We must confess that we also shared this opinion until this study was undertaken. We now realize that, although this is true in some cases, many of these patients who are incontinent do not have any residual urine or have only small amounts.

It is only necessary to read the scanty literature on the subject of vesical disturbances in cases of tabes dorsalis to realize that the subject is still one of the mysteries of medicine. The "hands off" policy has been the physician's procedure of choice for these unfortunate patients, and as a group they have not been especially well cared for in the past. More facts and clinical data concerning this condition are needed if a satisfactory solution to this diagnostic and therapeutic problem is ever to be achieved. In an effort to contribute data to this subject, this study was undertaken.

MATERIAL

This study is based on a review of the records in 977 cases in which the diagnosis of tabes dorsalis was made at the Mayo Clinic during the seven year period 1934 to 1940 inclusive. Two hundred and five (21 per cent) of the patients were females. Seven hundred and seventy-two (79 per cent) were males. The age of the patient at the time the diagnosis of tabes was first made at the clinic forms the basis of an interesting grouping of the patients (table 1). It will be noticed that the majority of patients, 670 (69 per cent), were in the age groups from 40 to 59 years. Of the 977 patients afflicted with tabes dorsalis, 419 (42.8 per cent) complained of symptoms referable to the urinary bladder. It is of interest to note that these figures agree fairly closely with the incidence of urinary symptoms in cases of tabes given by Langworthy, Dees and Lewis [6] in their study of 278 cases of tabes dorsalis. The relative incidence of vesical symptoms of male and female patients is of interest. Of the 205 female tabetic patients, 74 (36 per cent) suffered from symptoms referable to the bladder, whereas 345 (44.7 per cent) of the 772 male tabetic patients complained of vesical symptoms. The remainder of this study will be confined to the 419 cases in which vesical symptoms were present.

TABLE 1.—*Age Grouping of 977 Patients Who Had Tabes Dorsalis*

Age, Years	Patients	Per Cent
10-19	2	0.2
20-29	12	1.2
30-39	175	17.9
40-49	365	37.5
50-59	305	31.2
60-69	105	10.7
70-79	13	1.3
Total	977	100

ANALYSIS OF DATA ON 419 CASES OF TABES DORSALIS AND URINARY DYSFUNCTION

Vesical Symptoms.—Vesical symptoms are found most commonly among tabetic patients who are from 40 to 59 years of age (table 2). This is of course the age group in which urinary symptoms of obstruction of the vesical neck occur most often among men who do not have tabes dorsalis.

In considering the type of symptoms encountered in these cases, a word of explanation is in order. In many of these cases the vesical symptoms were of course purely coincidental and were in no way connected with the tabetic condition. As we mentioned previously and shall attempt to demonstrate subsequently, we feel that it is impossible to state with any degree of accuracy just what part the tabetic lesion plays in the vesical dysfunction in any given case. For this reason we have listed all urinary symptoms complained of by these patients. The incidence of the various urinary symp-

TABLE 2.—*Age by Decades of 419 Patients Who Had Tabes Dorsalis and Symptoms Referable to the Urinary Bladder*

	Males		Females	
Age, years	Number	Per Cent	Number	Per Cent
10-19	...	....	1	1.4
20-29	2	0.6	2	2.7
30-39	51	14.8	12	16.2
40-49	118	34.2	33	44.5
50-59	107	31.0	21	28.4
60-69	58	16.8	5	6.8
70-79	9	2.6	..	...
Total	345	100	74	100

3. Dees, J. E., and Langworthy, O. R.: An Experimental Study of Bladder Disturbances Analogous to Those of Tabes Dorsalis, J. Urol. **34**: 359-371 (Nov.) 1935.
4. Jacobson, C.: Personal communication to the authors.
5. Rose, D. K., and Shefts, L. M.: Tabetic Bladder: Discussion of Etiology and Cystometric and Pathologic Studies, South. M. J. **32**: 546-549 (May) 1939. Dees and Langworthy.[3]
6. Langworthy, O. R.; Dees, J. E., and Lewis, L. G.: Abnormalities of Micturition Due to Syphilis of the Nervous System, Am. J. Syph., Gonor. & Ven. Dis. **20**: 364-381 (July) 1936.

toms in the 419 cases is given in table 3. It will be observed that the most common symptoms were incontinence, hesitancy, poor stream, nocturia, terminal dribbling, infrequent desire to void and inability of the patient to tell when the bladder was full. As far as the male was concerned, aside from the incontinence and inability to tell when the bladder was full, the symptoms were those common to the condition of uncomplicated obstruction of the vesical neck.

TABLE 3.—*Type of Symptoms Referable to the Urinary Bladder of 419 Patients Who Had Tabes Dorsalis*

Type of Symptom	Incidence: Among 345 Males	Incidence: Among 74 Females
Incontinence of any type or degree including nocturnal incontinence	150	37
Nocturnal incontinence only	56	3
Urgency	16	9
Inability to know when bladder is full or infrequent desire to void	48	5
Hesitancy	157	12
Poor stream	120	8
Interrupted stream	9	0
Terminal dribbling	56	0
Episodes of acute retention	12	3
Frequency	28	14
Nocturia	80	22

Residual Urine.—The entire group of 419 cases were considered from the standpoint of the amount of residual urine present. We regret that our data on this subject are so incomplete. It will be noticed from table 4 that for 45.2 per cent of the male patients and 71.6 per cent of the female patients no determination of residual urine was made. This high percentage is due to the fact that the clinician in the clinic and to a less extent those of us in the urologic section for years have followed the old dictum that instrumentation in such cases should be avoided when possible. From this table it will be noticed that residual urine is much more common among men than among women. It will be noticed also that only 77 male patients were found to have more than 150 cc. of residual urine, and yet 150 male patients (table 3) complained of some form of incontinence. These figures suggest that though a generous portion of the incontinence in this condition could be an overflow type of incontinence certainly not more than 50 per cent could be attributed to this cause.

TABLE 4.—*Amount of Residual Urine Among 419 Tabetic Patients Who Had Symptoms Referable to the Urinary Bladder*

Amount of Residual Urine	Males: Number	Males: Per Cent	Females: Number	Females: Per Cent
Complete retention	2	0.6	2	2.7
More than 150 cc. of residual urine	75	21.7	7	9.5
Less than 150 cc. of residual urine	63	18.3	8	10.8
No residual urine	49	14.2	4	5.4
Patient not catheterized	156	45.2	53	71.6
Total	345	100	74	100

Incontinence.—The subject of incontinence is interesting and important. Probably no medical term is used more inaccurately. It is used inaccurately to describe cases of urgency or precipitate urination, to describe the constant dribbling of an overflowing bladder (paradoxical incontinence), to describe the occasional involuntary urination during sleep, and so on. In short, the word "incontinence" is used to describe so many conditions that an explanation should accompany it each time it is used. In this study it has not been an easy matter in some cases to classify accurately the type of incontinence owing to lack of determination of residual urine or inadequate description of the condition in the patient's history. However, a reasonably accurate classification of the types of incontinence found in these cases has been made in table 5. As mentioned before, 150 males and 37 females complained of incontinence. The most common type of incontinence encountered was a very mild type; this usually was described by the patient as "I occasionally lose a few drops of urine before I am aware of it" or "if I forget to empty my bladder at fairly regular intervals I may lose a little urine." Next in frequency of occurrence was continuous leakage. From table 5 it may be seen that, in more than half of the cases of this type of incontinence in which the amount of residual urine was determined, 150 cc. or more was present. This indicates that a generous proportion of these patients was probably suffering from a true overflow type of incontinence. Nevertheless, attention must also be called to the fact (table 5) that several of the patients who had pronounced incontinence had little or no residual urine. The probable reasons for the various types of incontinence will be considered subsequently.

TABLE 5.—*Type of Incontinence and Its Relation to Amount of Residual Urine Present Among 187 Tabetic Patients Who Complained of Urinary Incontinence*

Type of Incontinence	Males: Total	Males: Residual Urine, Cc.: 150 or More	Males: Residual Urine, Cc.: Less Than 150	Males: Residual Urine, Cc.: None	Males: Residual Urine, Cc.: Not Determined	Females: Total	Females: Residual Urine, Cc.: 150 or More	Females: Residual Urine, Cc.: Less Than 150	Females: Residual Urine, Cc.: None	Females: Residual Urine, Cc.: Not Determined
Marked incontinence (including so-called overflow incontinence)	42	23	5	3	11	13	3	2	2	6
Very mild and occasional incontinence (occasional loss of a few drops of urine)	57	12	17	2	26	14	0	0	0	11
Incontinence only with straining or coughing	2	0	0	0	2	4	0	0	0	4
Urgency to point of incontinence	6	1	0	0	5	4	0	1	0	3
Incontinence only when bladder was allowed to become too full before voiding	5	2	1	0	2	2	0	1	1	0
Nocturnal incontinence only	38	9	4	4	21	0	0	0	0	0
Total	150	47	27	9	67	37	3	4	3	27

Cystoscopic Data.—In most of the older textbooks of urology the "cord bladder" of tabes is described as one in which cystoscopic examination discloses some or all of the following: (1) reduction in expulsive force of the bladder, (2) reduction in sensation (as determined by how much pain the patient experiences during the time the cystoscope is manipulated), (3) relaxation of the vesical neck (as determined by observation only) and (4) trabeculation of the bladder. The trabeculation is described as being of fine caliber in contrast to the coarse trabeculation seen in the presence of urinary retention caused by obstruction of the vesical neck. All physicians who have had considerable cystoscopic experience will agree that all of these conditions are seen in only the minority of such cases, whereas

in most cases only a few are present. When the latter situation is present, it has resulted in a diagnosis such as "atypical cord bladder."

In studying these 419 tabetic patients who had symptoms referable to the urinary bladder, we were disappointed to find that only 129 had been subjected to cystoscopic examination. The reason for this low incidence of cystoscopic examination is of course the old, ever present, fear of the danger of instrumentation to tabetic patients who have "cord bladders." Unfortunately, the data in these cases in which cystoscopic examination was done were not always given in complete form. For this reason we are unable to present definite percentages for the incidence of the so-called typical findings associated with cord bladder. To make the best of the information available, table 6 is presented. It indicates the number of times reduction in sensation and expulsive force, relaxation of the vesical neck, trabeculation of the bladder and obstruction of the vesical neck were indicated on the records of the cystoscopic examination. One of the most interesting revelations in this table is that the size of the trabeculae in the bladders varied greatly. It will be noticed that the sizes of the trabeculae have been graded from 1 to 4.

TABLE 6.—*Data Concerning 129 Tabetic Patients Who Were Subjected to Cystoscopic Examination*

Observations on Cystoscopic Examination	Incidence: Among 111 Males	Incidence: Among 18 Females	Total
Size of trabeculae			
Grade 1	26	3	29
Grade 2	19	3	22
Grade 3	21	1	22
Grade 4	6	1	7
Expulsive force reduced	47	5	52
Reduction of sensation	54	7	61
Relaxation of vesical neck	50	12	62
Obstruction of vesical neck			
Lobar hypertrophy of prostate	49	0	49
Bars, contracture of vesical neck or carcinoma	10	0	10
Combination of two types	2	0	2
Total	61	0	61

This suggests that the old dictum that fine trabeculae indicate a neurogenic bladder whereas coarse trabeculae indicate obstruction of the vesical neck may be seriously questioned. This table also shows that definite obstruction of the vesical neck was reported in 61 (55 per cent) of the male patients who were subjected to cystoscopic examination. The obstruction in 49 of these 61 cases was caused by definite lobar hypertrophy, in 10 by bars, contractures of the vesical neck or carcinoma and in 2 by various combinations of the two preceding groups.

We were interested to know whether cystoscopic examination in the cases of incontinence would yield information which might help to clarify the situation. We found that cystoscopic examination had been performed in 48 cases in which incontinence had occurred. The cystoscopic findings are given in table 7. There seems to be no significant difference in data from those obtained in the entire group of 129 cases (table 6) except that the incidence of relaxation of the vesical neck in the incontinent group is somewhat higher.

Treatment by Antisyphilitic and Local Measures.—The question is often asked In what proportion of cases of tabes dorsalis will urinary symptoms improve as a result of antisyphilitic treatment? This question can be answered best by referring to the article on tabes dorsalis published by the Cooperative Clinical Group,[7] in which a study was made of 985 cases of tabes dorsalis, in all of which treatment with antisyphilitic measures was employed. The only urinary symptom listed in this article was incontinence. It was found that in 24 per cent of these treated patients the incontinence disappeared during treatment, while in an additional 36 per cent the condition was improved. This suggests that the urinary symptoms may be expected to improve in a considerable number of cases of tabes dorsalis after antisyphilitic treatment is instituted. It follows, therefore, that in any questionable case antisyphilitic therapy should always be given a fair trial before more radical therapeutic measures are undertaken.

TABLE 7.—*Data from Cystoscopic Examination Concerning 48 Tabetic Patients Who Had Incontinence*

Observations on Cystoscopic Examination	Incidence: Among 38 Males	Incidence: Among 10 Females	Total
Size of trabeculae			
Grade 1	6	2	8
Grade 2	10	3	13
Grade 3	9	2	11
Grade 4	4	1	5
Reduction of sensation	24	4	28
Reduction of expulsive force	21	4	25
Relaxation of vesical neck	27	7	34
Obstruction of vesical neck			
Lobar hypertrophy of prostate	13	0	13
Bars, contracture of vesical neck or carcinoma	2	0	2
Combination of two types	1	0	1
Total	16	0	16

Treatment by Transurethral Resection of the Vesical Neck.—Of the 345 males who had tabes and vesical symptoms, 35 (approximately 10 per cent) were subjected to transurethral prostatic resection. In some of these cases, of course, the urinary retention resulted from a simple obstruction of the vesical neck and the tabes dorsalis was purely a coincidental finding which played no part in the pathologic condition. In the majority of cases, however, most urologists would have difficulty in deciding whether the vesical dysfunction was the result of primary neurogenic atony, obstruction of the vesical neck with secondary atony or a combination of the two. This is evidenced by the fact that in 19 of the 35 cases diagnoses such as "cord bladder," "probable cord bladder" or "cord bladder associated

TABLE 8.—*Residual Urine Before Transurethral Resection in 35 Cases of Tabes Dorsalis*

Amount of Residual Urine, Cc.	Cases	Per Cent
More than 500	7	20.0
100 to 500	18	51.4
Less than 100	10	28.6
Total	35	100

TABLE 9.—*Age by Decades of Tabetic Patients Subjected to Transurethral Resection*

Age, Years	Patients
30-39	2
40-49	6
50-59	11
60-69	12
70-79	4
Total	35

7. O'Leary, P. A.; Cole, H. N.; Moore, J. E.; Stokes, J. H.; Wile, U. J.; Parran, Thomas; Vonderlehr, R. A., and Usilton, Lida J.: Cooperative Clinical Studies in the Treatment of Syphilis: Tabes Dorsalis, Ven. Dis. Inform. **19:** 367-396 (Nov.) 1938.

with obstruction of the vesical neck" were suggested by either the clinician or urologic consultants who saw the patient. For the majority of these patients in years past operation on the vesical neck would have been rejected because of fear of making them incontinent or increasing an already existing incontinence. In most of these cases cystoscopic examination disclosed reduction in expulsive force, reduction in sensation or both. In several cases relaxation of the vesical neck was mentioned in spite of the fact that definite enlargement of the prostatic lobes also was present. Cystometrograms were made in only a few cases; these revealed definite atonicity of the bladder with decrease in intravesical pressure and a marked sensory shift to the right. As stated previously, we have been unable accurately to establish the etiologic factor in vesical atony by means of cystometry. Thirteen of these patients were incontinent. The incontinence of 6 of them was no doubt a true overflow, as 3 had more than 1,000 cc. of residual urine and the other 3 between 500 and 1,000 cc. Five of the remaining patients who were incontinent were found to have between 100 and 500 cc. of residual urine and 2 less than 100 cc.

TABLE 10.—*Weight and Microscopic Examination of Tissue Removed at Transurethral Resection in 35 Cases of Tabes Dorsalis*

Weight of Tissue, Gm.	Cases	Microscopic Examination of Tissue				
		Adenofibromatous Hyperplasia	Carcinoma	Smooth Muscle	Smooth Muscle and Inflammatory Tissue	Combination of Types
0 - 3	8	3	..	2	2	1
4 - 5	5	5	..	..	..	..
6 - 10	9	8	..	..	..	1
11 - 20	7	7	..	..	..	..
21 - 50	5	4	1	..	..	..
More than 50	1	1	..	..	..	..
Total	35	28	1	2	2	2

The amount of residual urine found in the entire group of 35 cases is shown in table 8, and the age of the patients is given in table 9.

The amount of obstructive tissue present in the vesical neck in these cases was not great (table 10). It will be noticed that in approximately two thirds of the cases 10 Gm. of tissue or less was removed and 5 Gm. or less was removed in 37 per cent. This serves to emphasize the important point previously mentioned by Braasch and Thompson [8] that minimal amounts of obstruction of the vesical neck in the presence of an atonic bladder may be responsible for a great amount of vesical disability. It follows, therefore, that the vesical neck must be examined very carefully in cases of this disease.

Results of Operation.—The results of operation in these 35 cases were gratifying. Residual urine was eliminated in almost all cases. Of the 13 patients who suffered from incontinence prior to operation, 11 were relieved completely of this distressing condition. The other 2 were considerably helped. None of the patients who were not incontinent before operation were made incontinent by the operation. We are convinced that there is no more danger of incontinence following transurethral resection in cases of tabes dorsalis than in other cases. The patients in whom one would be inclined to expect mediocre or poor results would be the 19 patients in whom it was felt that part if not all of the vesical dysfunction was due to the tabetic condition. This, however, proved not to be the case. In 15 of these 19 cases, excellent results were obtained and in 4 definite improvement occurred. No patients were made worse by the operation.

In the subsequent follow-up of these patients it has been brought to our attention by O'Leary [9] and his colleagues that the general condition of the patients shows striking improvement as evidenced by gain in weight, decrease of anemia and lassitude, and especially decrease in the frequency and severity of neuritic pains when the vesical dysfunction is corrected and the residual urine eliminated. This is no doubt owing to the fact that the urinary infection can be controlled more efficiently or eliminated entirely.

COMMENT

As far as the subject of incontinence is concerned, it seems to us that this condition in cases of tabes dorsalis is chiefly of two general types, (1) overflow from a distended bladder and (2) intermittent involuntary urination or the occasional loss of a small amount of urine before micturition takes place. This urine is lost apparently because there is so much sensory loss that the patient is not aware that micturition is about to begin. It seems analogous to the condition of enuresis that some patients have while sound asleep. As a matter of fact, many tabetic patients complain of only "incontinence" that occurs during sleep.

We have no clinical data that would tend to confirm the theory that increased tone of the external urethral sphincter of tabetic patients may contribute to the urinary retention and difficult micturition. All of the data obtained from this study point to the fact that fibrosis or contracture of the internal (vesical) sphincter or obstruction in this situation produced by the enlargement of the prostate gland is more likely to be responsible. If any obstruction is present, transurethral resection of the vesical neck will yield brilliant results in many cases. As far as we are aware, any local treatment of the external urethral sphincter has been of no benefit in any of these cases. Any tabetic patient who has difficulty in voiding, incontinence (especially of the overflow variety), residual urine and some demonstrable obstruction of the vesical neck has an excellent chance of relief of symptoms by complete transurethral resection.

Any degree of obstruction at the vesical neck of a tabetic patient, no matter how minute, may produce severe vesical disability, whereas the same amount of obstruction may not cause any disability among patients who do not have tabes. The reason for this is quite evident. The interruption of the reflex arc which carries the impulses that initiate micturition plus the inability of the patient properly to recognize the presence of vesical distention (the result of involvement of the sensory fibers of the sacral nerves) results in gradual vesical distention which terminates in various degrees of vesical atony. When the atony is extreme and the involvement of the sensory pathways well defined, the desire to void may never be regained by the patient even though all obstruction of the vesical neck is removed. Nevertheless, such a patient can be taught after resection to empty his bladder by abdominal and manual pressure at regular intervals, so that usually the bladder is completely emptied at each voiding. This makes it possible completely to eliminate the urinary infection by use of urinary antiseptics so that the patient is able to live a fairly comfortable life without incontinence or the necessity of routine catheterization.

8. Braasch, W. F., and Thompson, G. J.: Treatment of the Atonic Bladder, Surg., Gynec. & Obst. **61**: 379-384 (Sept.) 1935.

9. O'Leary, P. A.: Personal communication to the authors.

THE SURGICAL TREATMENT OF THE AUTONOMOUS NEUROGENIC BLADDER

REED M. NESBIT, M.D.
AND
WILLIAM G. GORDON, M.D.
ANN ARBOR, MICH.

The autonomous neurogenic bladder results from destructive lesions of the cauda equina or conus terminalis. The bladder is totally deprived of its essential innervation by the parasympathetic division of the autonomic nervous system. The detrusor becomes hypertonic, but, because of the destruction of the spinal reflex, all reflex contractions are abolished. Bladder sensation is lost and voluntary sphincteric control is destroyed (fig. 1).

Sharing in the hypertonicity of the detrusor are those circularly arranged fibers at the vesical neck described as the internal sphincter. The hypertonic internal sphincter acts as a definite obstruction, almost exactly analagous to having contracture of a vesical neck superimposed on the entire picture. As a result, urine does not escape from the bladder until the intravesical pressure exceeds the obstruction in the outlet. Since reflex activity of the bladder is lost, voiding is accomplished only by straining or by continuous overflow dribbling incontinence. As time elapses, the obstructive manifestations become more pronounced as the bladder decompensates and increasing amounts of residual urine remain in the bladder. Ultimately, almost complete decompensation of the detrusor may occur with severe damage to the upper urinary tract.

Since nothing can be done about restoring innervation of the bladder surgical treatment is aimed at removing the obstructive factor. If this can be accomplished the patient should carry relatively small amounts of residual urine. By periodic attempts to void with straining he may also avoid to some degree the unpleasant continuous or periodic dribbling, and, in addition, will be spared the sequelae of decompensation of the bladder and damage to the upper tract.

The earlier methods of managing the problem were by permanent suprapubic cystotomy or by intermittent self catheterization. Permanent cystotomy is unsatisfactory because the bladder rapidly becomes greatly contracted and has practically no capacity. Because of the dangers of infection, self catheterization or a permanent inlying catheter are poorly tolerated.

More recently, surgical treatment has been directed at relieving the obstruction of the internal sphincter by more direct methods; namely, presacral neurectomy or transurethral sphincterotomy.

Presacral neurectomy was based on the premise that the internal sphincter was innervated by thoracolumbar supply carried through the intact presacral nerves and that it became hypertonic owing to imbalance caused by removal of the parasympathetic inhibition. There is really no conclusive evidence that the internal sphincter has any different innervation than the rest of the detrusor muscle, of which it is only a specialized portion. Furthermore, regardless of the innervation concerned, prolonged hypertonicity of the internal sphincter may cause it to become permanently spastic. Our limited experience with presacral neurectomy in these cases has not been encouraging.

Transurethral sphincterotomy is a more logical procedure since the obstructive lesion resembles contracture of the vesical neck. The results have proved encouraging, especially when operation is performed before secondary atony of the bladder has supervened. It is of importance to have the resection complete, since the expulsive force of the bladder is already inefficient because reflex activity has been abolished. In the two representative cases presented, the first is an example of the result obtained before secondary atony of the bladder has occurred. In the second case, atony of the bladder had occurred but tonicity was restored after a period of drainage after cystotomy.

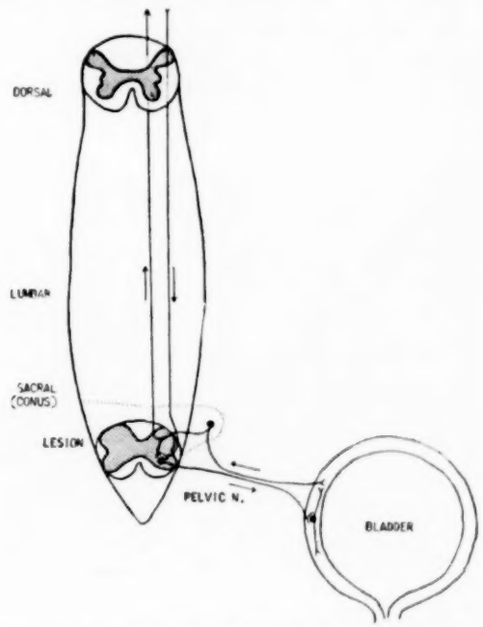


Fig. 1.—The autonomous neurogenic bladder is caused by any lesion which destroys the conus or cauda equina. The bladder is completely deprived of external innervation and depends entirely on its intrinsic myenteric plexus, whose fibers lie within the bladder wall. The bladder musculature and internal sphincter both are hypertonic. Despite the high intravesical pressure, the tonic sphincter acts as an obstruction. Since reflex activity is abolished, evacuation occurs only when the intravesical pressure exceeds the sphincteric obstruction. Voiding is by dribbling overflow. A high residual urine is present.

REPORT OF CASES

CASE 1.—E. H., a youth aged 18, admitted Nov. 8, 1940, complained chiefly of having to strain to urinate and intermittent dribbling of urine. His parents stated that intermittent dribbling had been present since birth to a moderate degree. The patient had always had to strain to void, which condition has been slowly increasing in the past three years. He had been seen in the University Hospital in May 1927 and the diagnosis of spina bifida, neurogenic bladder and urinary incontinence was established. There had been moderate increase of straining since that time.

The past and the family history were irrelevant.

A general examination was negative except for saddle anesthesia. The patient voided a poor stream with straining.

Laboratory studies gave negative results except for a definite bacillary urinary infection. The residual urine amounted to 520 cc.

Cystometric study revealed a typical autonomous neurogenic bladder. Panendoscopic examination revealed a hypertonic internal sphincter and heavy trabeculation of the bladder.

From the Department of Surgery, University of Michigan Medical School.

Read before the Section on Urology at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 4, 1941.

On Jan. 27, 1941 transurethral sphincterotomy was performed, 3 Gm. of tissue being removed. Microscopic examination revealed this to be smooth muscle with only a few prostatic glands (fig. 2).

After the operation the patient voided easily without straining, and the dribbling incontinence was minimal if the patient emptied his bladder periodically. A check-up one month after the operation revealed no residual urine.

CASE 2.—A man aged 35, admitted Dec. 24, 1940, complained chiefly of straining and dribbling incontinence.

As long as he could remember he had strained to void and lately there was dribbling, overflow incontinence. The straining had increased sharply in the past year, and the urinary stream was merely a dribble. The patient could not tell when the bladder was full but had attempted to void periodically at the time dribbling began.

A soft swelling had been present over the lumbosacral region since birth. There had been continuously present a trophic ulcer of the right foot for six years.

The past and the family history were irrelevant.

On physical examination the pertinent conditions were a lumbosacral meningocele with a small draining sinus. Neurologic conditions were diagnostic of myelodysplasia of the lumbar and sacral cord.

Laboratory examinations revealed no abnormality.

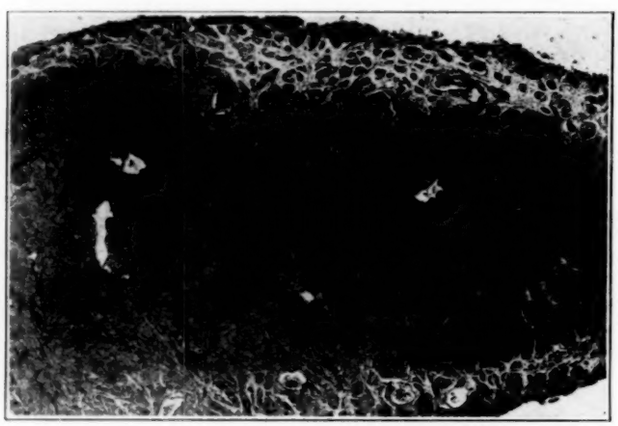


Fig. 2 (case 1).—Section of tissue removed by transurethral resection. It consists almost entirely of smooth muscle with only occasional prostatic glands.

Cystometric examination revealed a bladder in which sensation and reflex activity were lost. There was no rise of intravesical pressure until more than 700 cc. of fluid had been introduced, at which time the pressure increased slowly to 15 mm. of mercury at 800 cc. The residual urine was 600 cc. Cystoscopic examination revealed a heavily trabeculated bladder. The internal sphincter was hypertonic and rigid.

The diagnosis made was decompensated autonomous neurogenic bladder with hypertonic internal sphincter producing obstruction.

On December 26 transurethral resection was carried out, 4 Gm. of smooth muscle being removed. The patient voided much more easily after the operation but continued to carry from 200 to 480 cc. of residual urine. After about two months the stream again became poor and extreme straining with almost total retention developed.

Cystometric examination on April 16, 1941 revealed almost total atony of the bladder. On April 18 a suprapubic cystotomy was done; following this the bladder rapidly recovered its tone, and on May 1 a further transurethral resection was carried out. Following this the patient has been voiding more easily, with residual urine averaging 90 cc.

COMMENT

We feel that it is important to recognize and differentiate the decompensated autonomous neurogenic bladder from the atonic bladder of tabes dorsalis and from the decompensated bladder of advanced prostatism. In the first instance, the pronounced trabeculation of the autonomous bladder, in conjunction with the hypertonic internal sphincter and characteristic neurologic conditions of destruction of the sacral cord, differentiate it from the atonic tabetic bladder. Differentiation of the decompensated autonomous bladder from the atonic bladder of advanced prostatism is less easy, but the age of the patient, the history of onset and neurologic and cystoscopic examinations make the distinction readily possible.

SUMMARY AND CONCLUSIONS

The autonomous neurogenic bladder results from destructive lesions of the conus terminalis and cauda equina. Since the internal sphincter shares in the hypertonicity of the bladder, it acts as an outlet obstruction. As with any outlet obstruction, bladder decompensation and damage to the upper urinary tract will ultimately result if the condition persists for a sufficiently long time.

Modern treatment of the autonomous neurogenic bladder attempts to relieve the outlet obstruction. Presacral neurectomy has not proved satisfactory in our experience. Transurethral sphincterotomy yields more gratifying results, particularly if undertaken before the bladder has decompensated.

ABSTRACT OF DISCUSSION

ON PAPERS OF DR. EVANS, DRS. EMMETT AND BEARE AND DRS. NESBIT AND GORDON

DR. WILLIAM P. HERBST, Washington, D. C.: The work that Dr. Evans did in recording nerve impulses was done on animals, and while that is suggestive as to what might occur in man I don't feel that we should take it as being identical and interpret the findings in animals and apply them to human beings. His explanation of the function of the bladder is about as simple as any I have heard or can conceive of and certainly should prove as satisfactory a guide to understanding and comprehension of various bladder dysfunctions as anything that we have had presented to us. Dr. Emmett and Dr. Beare have shown a bright spot in handling tabetic bladder patients with incontinence and retention. They have shown that resection is justifiable and not frequently enough resorted to. The work of Nesbit and Gordon demonstrates a sound idea of the handling of the problem of the autonomic bladder. Here we have a bladder that can't empty itself on account of neck spasticity and by the simple procedure of removing this bladder neck obstruction one restores the patient to a much better status.

DR. LLOYD G. LEWIS, Baltimore: I agree with Drs. Emmett and Beare about the treatment of the tabetic bladder. For differentiation between the atonic bladders of vesical neck obstruction and of tabes, one needs temporarily to disregard bladder capacity and to study reflex activity by systometry. The normal bladder will forcibly contract when the intravesical pressure exceeds 12 mm. of mercury. In the tabetic patient the voiding reflex fails to develop, even when the pressure reaches 30 or 40 mm. of mercury. In the atonic bladder of obstruction there is a definite response to stretch on 12 mm. pressure, which can be seen in a recorded cystometrogram. I agree with Drs. Gordon and Nesbit in their treatment of automatic bladders. Dr. Evans's study of vesical activity by means of the oscillograph adds to our knowledge of reflex activity of the bladder. We are all aware of coordinated reflexes between the external sphincter and the detrusor. During urination, if the external sphincter is contracted voluntarily, relaxation of the detrusor automatically follows. Henle, Kohlrausch and Rosenthal in 1856 adequately described the bladder neck. At Young's suggestion Wesson studied and described the orderly arrangement of detrusor fibers around the vesical orifice. As far as I know there has been no anatomic description of a true internal sphincter. The prostatic musculature or so-called

sphincter medius is the only sympathetically innervated muscle surrounding the urethra. I cannot accept Learmonth's work on the innervation of the vesical orifice musculature. Learmonth observed the orifice from the posterior urethra during stimulation and section of the presacral nerve. I believe he described trigonal action on the shape of the orifice, rather than sphincteric action. How long must we hypothecate an internal sphincter innervated by the sympathetic nervous system? Henle described the longitudinal detrusor fibers which pass through the vesical orifice to insert in the posterior urethra. When they contract forcibly, the vesical orifice is advanced forward.

DR. HERBERT ELLIS LANDES, Chicago: The analysis of a large series of tabetic patients with bladder dysfunction presented by Drs. Emmett and Beare provides material of great clinical interest. They are to be congratulated on the amazing results obtained by bladder neck resection in these cases. Yet it is a little difficult to see why prostatic resection on the dilated internal sphincter should improve the ability to empty the bladder. I gathered from their statistics that a great many of these tabetic patients had some evidence of vesical neck obstruction, however, and that partial paralysis of the bladder resulted in a relatively high degree of obstruction in the presence of slight prostatic enlargement. Since the tabetic and the prostatic patient have about the same age incidence, the association of the two diseases is not infrequent. Dr. Wilkes pointed out in his paper that small amounts of obstruction produce residual urine out of all proportion to the size of the prostate in these cases. In this group one would expect beneficial results by surgery directed to the relief of mechanical obstruction.

DR. FREDERICK C. MCLELLAN, New York: The investigation of Dr. Evans concerning bladder physiology is the necessary background for the understanding of abnormal bladder behavior resulting from disease of the central nervous system. He has clarified the so-called "filling" and "emptying" antagonistic function of the sympathetic and parasympathetic nerves and shown that the pelvic nerves contain the necessary pathways to carry on micturition. The sympathetic fibers play little, if any, part. Since bladder activity is controlled by a spinal cord reflex in the sacral region and inhibited or modified by suprasegmental levels, a study of bladder behavior in many respects parallels that of a somatic tendon reflex. Lesions of the suprasegmental levels may result in increased or involuntary bladder contractions, and, on the other hand, interruption of the essential reflex fibers may result in suppression of the reflex with bladder paralysis. Drs. Emmett and Beare have presented a review of tabetic patients with urinary complaints examined at the Mayo Clinic. They have noted that a certain number of patients, in addition to the paralyzed bladder musculature, have an organic obstruction at the bladder outlet and that this further increases the difficulty in evacuating the urine. Although the neck of the bladder in the atonic neurogenic bladder is usually relaxed and funnel shaped and the urethral resistance is lowered, the coincidence of the older age group makes the possibility of prostatic hypertrophy, carcinoma or fibrous contraction of the bladder neck a not uncommon complication. When transurethral resection is adequately performed, the function is improved. The papers of Drs. Nesbit and Gordon and Drs. Emmett and Beare are complementary in that they discuss the two types of bladder paralysis associated with interruption of the reflex pathways, complicated by an obstructing factor at the bladder neck. Whereas Emmett and Beare discuss the atonic neurogenic bladder, Nesbit and Gordon discuss the hypertonic or autonomous neurogenic bladder. The spastic so-called "internal sphincter" of the latter type is part of the general tonicity of the detrusor but may cause a definite obstruction to the outflow of urine which, without the obstruction, can be evacuated only by increasing the intra-abdominal pressure or by persistent overflow incontinence. Resection of the internal sphincter permits the urine to be forced more completely from the bladder and, with periodic attempts at emptying the bladder, the patient may be kept fairly dry.

DR. IRVING SIMONS, New York: By observing both sensory points and manometric pressures one can study the relation of true somatic hyperreflexia in neurologic diseases to true hypertonia of the detrusor. One can also show that there is usually hyposensitivity in neurogenic hypotonia of the detrusor, often incorrectly termed tabetic cord bladder.

DR. JOSEPH P. EVANS, Cincinnati: I have but little to add except to express my appreciation of the opportunity of joining in this symposium, from which I have learned a great deal. Dr. Herbst has wisely pointed out that some of the work I presented was based on animal experiments and therefore might not be directly applicable to the present problem. I wish that I could join wholeheartedly with Dr. Lewis in relegating the internal sphincter mechanism to the realm of abandoned theory, because by so doing one can still further simplify the concept of bladder activity. The fact that the action currents running to the region of the bladder neck are the same as those running to the fundus would suggest that the entire fundus and so-called internal sphincter or bladder neck act in unison. It may well be that his explanation will prove to be the correct one. I find it difficult, however, to accept mechanical obstruction as the explanation of the retention that develops following transverse lesions of the spinal cord or following destruction of the conus. I do not say that the sympathetic system has nothing to do with bladder activity. Certainly some sensory discharge is carried over the sympathetic pathways, but it is my belief that under the circumstances of normal micturition the sympathetic system does not play an essential role, either motor or sensory.

DR. JOHN L. EMMETT, Rochester, Minn.: I agree with what Dr. Lewis has had to say in regard to the internal vesical sphincter. I believe many such conceptions must be eliminated from our minds before we can proceed in an orderly manner to discuss the physiology of the bladder. I have not been able to distinguish between a primary neurogenic atonic bladder and a secondary myogenic atonic bladder. Dr. Simons and I have had some friendly discussions by letter about this subject, but I am still of the opinion that I could show to Dr. Simons cystometrograms of severely atonic bladders in cases of long-standing obstruction of the vesical neck in which he could not tell whether the atonicity was a result of obstruction or a primary neurogenic lesion. Dr. Landes has asked a pertinent question. He asked why resection of the vesical neck should be performed on a patient in whom the vesical neck already is dilated. This is difficult to answer, but a case in point may somewhat answer the question: Approximately a year ago a man aged 63 came to the clinic for examination and treatment. Twenty years previously, examination at the clinic had disclosed a severe tabes dorsalis accompanied by an overflow type of urinary incontinence. The vesical symptoms were his chief reason for seeking medical treatment. A diagnosis of cord bladder was made, and the patient returned home. His next admission to the clinic, twenty years later, was because of complete urinary incontinence associated with foul, odoriferous urine that made it impossible for him to associate with other people, even though he was most careful to keep his rubber urinal clean. Examination disclosed the presence of between 1,500 and 2,000 cc. of residual urine. At cystoscopy the vesical neck was found to be so relaxed that the walls of the prostatic urethra made almost a right angle at the verumontanum. In spite of the relaxation of the vesical neck there was a small but definite enlargement of both lateral lobes of the prostate gland. It was difficult to see why resection of the vesical neck should relieve this patient, but it did. Only 8 Gm. of tissue could be removed, but after the operation the patient was able to empty his bladder completely by straining, using abdominal pressure and employing about four minutes to perform the act of micturition. He was taught to void at regular intervals four times daily. By this regimen he was able to empty his bladder completely, the overflow incontinence was eliminated completely and it was possible to eradicate the urinary infection.

DR. WILLIAM G. GORDON, Ann Arbor, Mich.: I should like to say one more word about the internal sphincter problem. I hope that I haven't implied that I subscribe necessarily to the idea that there is an internal sphincter; but, in the autonomous bladder, that portion of the detrusor behaves as an obstruction. I have used the term somewhat conventionally, but I am inclined to agree with Dr. Lewis in the interpretation that, if it exists at all, it is unimportant except under this particular set of circumstances.

SKELETAL SCLEROSIS IN CHRONIC SODIUM FLUORIDE POISONING

PAUL C. HODGES, M.D.
OMAR JOHN FAREED, M.D.
GEORGE RUGGY, M.D.
CHICAGO
AND
JACK S. CHUDNOFF, M.D.
DETROIT

It is established that long industrial exposure to cryolite [1] or to crushed phosphate rock containing sodium fluoride as an impurity [2] eventually causes severe generalized sclerosis of the skeleton, the tendinous attachments of muscles and of other body tissues. It is known also that the enamel of the permanent teeth of children will be mottled in a characteristic manner [3] if the children habitually drink water containing 1 part or more per million of fluorine salts such as sodium fluoride during the years in which the enamel of these teeth is being laid down.[4]

Since mottled enamel is cosmetically undesirable, considerable effort has been exerted to avoid the use of contaminated water, but it has been assumed that the use of such water was not followed by deleterious lesions elsewhere in the body. Recently, however, there have been reported from North Africa,[5] India [6] and Argentina [7] cases of radiologically demonstrable skeletal sclerosis in which fluoride-contaminated drinking water appeared to be the only causative factor.

The present paper deals with an unsuccessful attempt to demonstrate skeletal sclerosis in the inhabitants of first one and then another community in central Illinois where the drinking water, drawn from deep wells, is known to be contaminated with fluoride.[8]

There are American communities in which the fluoride content of the public water supply is much greater than 3 parts per million, and throughout the country contamination of food is increasing because of the widespread use of the fruit and vegetable sprays containing sodium fluoride as the active agent and of phosphate fertilizer and stock food in which fluoride occurs as an impurity.[9] Since skeletal sclerosis presumably is followed by sclerosis of the bone marrow, kidney and other vital tissues, it is desirable that the search for skeletal lesions should be continued.

From the Division of Roentgenology, Department of Medicine, University of Chicago.

This work was aided by a grant from the Committee on Scientific Research of the American Medical Association.

1. Möller, P. F., and Gudjonsson, S. V.: Massive Fluorosis of Bones and Ligaments, Acta radiol. **13**: 269, 1932.

2. Bishop, P. A.: Bone Changes in Chronic Fluorine Intoxication: A Roentgenographic Study, Am. J. Roentgenol. **35**: 577 (May) 1936.

3. Black, G. V., and McKay, T. S.: Mottled Teeth: An Endemic Developmental Imperfection of the Teeth Heretofore Unknown in the Literature of Dentistry, Dent. Cosmos **58**: 129, 1916.

4. Smith, Margaret C.; Lantz, Edith M., and Smith, H. V.: The Cause of Mottled Enamel, a Defect of Human Teeth, Bulletin 32, University of Arizona College of Agriculture, June 10, 1931. Schaur, Isaac, and Smith, Margaret C.: The Histologic Changes in the Enamel and Dentin of the Rat Incisor in Acute and Chronic Experimental Fluorosis, Bulletin 52, University of Arizona College of Agriculture, June 15, 1934.

5. Gaud, M.; Charnot, A., and Langlais, M.: Bull. Inst. hyg. du Maroc, 1934, no. 1-2; cited by Greenwood.[9]

6. Shortt, H. E.; McRobert, G. R.; Barnard, T. W., and Nayar, A. S. M.: Endemic Fluorosis in the Madras Presidency, Indian J. M. Research **25**: 553, 1937; cited by Greenwood.[9]

7. Capizzano, N.; Paterson Toledo, R.; Megy, F., and Valotta, J.: Osteopetrosis generalizada ¿enfermedad endémica regional en la República Argentina? Comentarios sobre nueve casos, Rev. med. y cien. afines **1**: 15 (Aug. 30) 1939; cited by Greenwood.[9]

8. Weartt, J. G., and Klassen, C. W.: Fluorides in Illinois Water Supplies, J. Am. Water Works A. **29**: 985 (July) 1937.

9. Greenwood, D. A.: Fluoride Intoxication, Physiol. Rev. **20**: 582 (Oct.) 1940.

KEMPTON STUDY

The first study was conducted at Kempton, Ill., where the fluoride content of the drinking water appears to be variable over a range of from approximately 1.2 parts per million to 3 parts per million. In this community 86 subjects were examined, the ages ranging from 7½ to 71 years, the exposure to fluoride ranging from none to sixty-one years. In all cases a roentgenogram was made of the pelvis and the lower part of the lumbar spine and in some cases of other parts of the skeleton as well, but in no instance did we observe the occurrence of generalized sclerosis.

BUREAU STUDY

The second study was conducted at Bureau, Ill., where the fluoride content of the drinking water is approximately 2.5 parts per million. Thirty-one subjects were examined, the ages ranged from 18 to 78 years and the exposure to fluoride from eighteen to sixty-eight years. Here also there was no instance of generalized skeletal sclerosis.

Roentgen Technic.—Care was exercised to obtain films of good technical quality. The roentgen equipment consisted of a demountable table provided with a Potter grid and a 1.5 kilovolt shockproof roentgen ray tube connected to an oil-immersed step-up transformer without a rectifier. Films were made at 70,000 volts, 10 milliamperes, exposure time ranging from one second to eighteen seconds, depending on the measured thickness of the part, the exact exposure in each case being determined from an empirical curve which had been found to produce good quality roentgenograms of normal subjects. Films were processed for five minutes in standard strength commercial developing solution maintained at a temperature of 65 F., this work being carried on in a portable darkroom.

Interpretation of Roentgenograms.—As the work progressed, the films were examined and a provisional diagnosis was rendered. Subsequently all the films from both communities, together with films of normal subjects made with the field equipment in the field and in Chicago, were submitted to a group made up of radiologists and orthopedic surgeons.

Dental Observations.—The radiologic study at Kempton had been preceded by a survey [10] in which typical mottling of the dental enamel was demonstrated in practically all the subjects who had been exposed to the contaminated drinking water during early childhood, and earlier studies by others [11] had shown typical mottling of the dental enamel of school children in Bureau.

CONCLUSION

1. The use of drinking water containing up to 3 parts per million of sodium fluoride apparently does not cause radiologically demonstrable sclerosis of the skeleton even though the water is taken for a long period of time.

2. As an aid in predicting the result of increased fluoride contamination of food, the search for skeletal sclerosis should be continued in American communities in which the fluoride content of the drinking water exceeds 3 parts per million.

10. Blaney, J. R.: Personal communication to the authors.

11. Deatherage, C. F.; Klassen, C. W., and Weart, J. G.: Fluorides and Mottled Enamel in Illinois, Illinois Dent. J. **8**: 194, 1939.

HISTORY AND PRESENT STATUS OF OXYGEN THERAPY AND RESUSCITATION

RALPH M. TOVELL, M.D.
AND
JOSEPH E. REMLINGER JR., M.D.
Members of the Department of Anesthesia, Hartford Hospital
HARTFORD, CONN.

During the past twenty years there has been a growing appreciation that oxygen therapy and resuscitation are valuable adjuncts in the physician's armamentarium. Although both are in the infancy of their development, their history may be traced through many years. In ancient times air was considered one of the four elements, and the clinical manifestations of many diseases were attributed to it. Early medical writings record the use of various procedures to stimulate respiration, the function of which was thought to be the cooling of the blood. Under such conditions it is little wonder that attempts to revive those apparently dead had a rather variable fate. The earliest and most successful of these methods was mouth to mouth insufflation, an example of which is found in the Bible.[1] Elisha is said to have restored to life the son of a Shulamite woman by breathing into the mouth of the child.

With the dawn of the seventeenth century many changes in medieval practices were effected. In 1628 Harvey[2] demonstrated the circulation of the blood. Boyle[3] in 1666 proved conclusively that the presence of air was essential for life. Four years later Mayow[4] observed that this same substance was necessary for the conversion of venous into arterial blood. Approximately a hundred years later, Priestley[5] isolated the "nitro-aërial" substance of Mayow and called it dephlogisticated air. He did not fully realize the significance of his work, and it remained for Lavoisier to demonstrate that the gas was absorbed by the lungs, burned by the tissues and eliminated as carbon dioxide and water.

The discovery of oxygen aroused considerable interest in medical circles, and in 1798 Thomas Beddoes[4] established his Pneumatic Institute at Clifton, where the gas was used in the treatment of many diseases. As a result of its abuse and misuse, considerable skepticism arose as to its actual therapeutic value, and during the next hundred years the procedures suffered from the unmerited neglect which eventually supervenes when a method is used as a panacea. However, experimental investigation during this period proved fruitful. Paul Bert[6] explained the effects of high altitude on respiration as due to a reduction in the partial pressure of oxygen. Zuntz, Mosso[7] and others elaborated on these observations. Araki[8] and Walter[9] noted the effects of ingestion of acid on blood and respiration. Cooper pointed out the deleterious effects of cerebral ischemia.[10] Claude Bernard observed the asphyxial properties of carbon monoxide.[11]

In the meantime, resuscitation claimed the attention of the medical world. The high incidence of drowning in Holland prompted the organization of the Dutch Amsterdam Society in 1767 for the purpose of formulating reliable life-saving methods.[12] The procedures advocated by the Dutch were presented before the Royal Humane Society in England in 1773 by Cogan.[13] The measures consisted chiefly of the use of heat, blood letting, rectal instillations of tobacco smoke, barrel rolling and mouth to mouth insufflation. Under the auspices of the two societies rules were formulated and the various methods were approved or discarded as experience proved their worth. In 1776 John Hunter[14] recommended insufflation of air by means of bellows, a method previously suggested by Paracelsus in 1530. The procedure became very popular and the apparatus designed by Charles Kyte was readily accepted by the Royal Society.[13] Hunter also suggested that oxygen, discovered only two years previously, might prove more efficacious in resuscitation than common air. With the publication in 1829 of Leroy's work on resuscitation of animals,[13] the use of bellows fell into disrepute. Since then various mechanical devices have been introduced but for the most part have been considered, until recently, less efficient than manual methods. The most notable of the mechanical devices are the ones supplying intermittent negative pressure and those employing positive and negative pressure, both of which have a definite place in modern resuscitation. Manual resuscitation assumed a scientific basis with the advent of Hall,[15] Howard[16] and Silvester.[17] Although clumsy, their methods were efficient and widely used until 1903, when Shafer[18] described the currently popular prone pressure type of artificial respiration. Recently Nielsen[19] added the "arm lift" to the method, making his a combination of the prone pressure and the Silvester procedure.

With the advent of the World War, the success of Haldane,[20] Meltzer,[21] Barcroft, Hunt and Dufton[22] in treating pulmonary edema and pneumonia with oxygen reestablished its use. Since then more efficient means of administering this gas have been developed. Clinicians have become more cognizant of the vicious cycle initiated by lack of oxygen, and the recognition and prompt treatment of this condition is considered a matter of paramount importance.

Read before the Section on Anesthesia at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 4, 1941.

1. II Kings **4**: 32-37.
2. Harvey, William: Exercutatio anatomica de motu cordis et sanguinis in animalibus, Frankfurt, G. Fitzer, 1628.
3. Boyle, Robert: Nova experimenta physico-mechanica de vi aeris elastica et ijusdem effectibus, Rotterdam, A. Leers, 1669.
4. Garrison, F. H.: History of Medicine, Philadelphia, W. B. Saunders Company, 1929.
5. Priestley, Joseph: Observations on Different Kinds of Air, Phil. Tr. Roy. Soc., London **62**: 147-264, 1772.
6. Bert, Paul: La pression barométrique, Paris, 1898.
7. Mosso, Angelo: Life of Man on the High Alps, translated from the second edition of the Italian by E. L. Kiesow, London, T. F. Univin, 1898.
8. Araki, T.: Ueber die chemischen Aenderungen der Lebensprocesse in Folge von Sauerstoffmangel, Ztschr. f. physiol. Chem. **19**: 442, 1894.
9. Walter, F.: Untersuchungen über die Wirkung der Säueren auf den thierischen Organismus, Arch. f. exper. Path. u. Pharmakol. **7**: 148, 1877.
10. Beecher, H. K.: The Physiology of Anesthesia, New York, Oxford University Press, 1938.
11. Drinker, C. K.: Carbon Monoxide Asphyxia, New York, Oxford University Press, 1938.
12. Meltzer, S. J.: History and Analysis of the Methods of Resuscitation, M. Rec. **92**: 1, 1917.
13. Keith, Arthur: Three Hunterian Lectures on the Mechanism Underlying the Various Methods of Artificial Respiration Since the Founding of the Royal Humane Society in 1774, Lancet **1**: 745, 825 and 895, 1909.
14. Cited in Meltzer[12] and Keith.[13]
15. Hall, Marshall: New Mode of Effecting Artificial Respiration, Lancet **1**: 229, 1856.
16. Howard, B.: The Direct Method of Artificial Respiration, Tr. Am. M. A. **22**: 313, 1871; Lancet **2**: 194, 1877.
17. Silvester, H. R.: A New Method of Resuscitating Stillborn and of Restoring Persons Apparently Drowned or Dead, Brit. M. J. 1858, pp. 53 and 576.
18. Schafer, E. A.: Artificial Respiration in Man, in Harvey Lectures, 1907-1908, Philadelphia, J. B. Lippincott Company, 1908, pp. 223-243.
19. Nielsen, Holger: A Method of Resuscitation, Ugesk. f. læger **94**: 1201 (Dec. 15) 1932.
20. Haldane, J. S.: The Therapeutic Administration of Oxygen, Brit. M. J. **1**: 181 (Feb. 10) 1917.
21. Meltzer, S. J.: Therapeutic Value of Oral Rhythmic Insufflation with Oxygen, J. A. M. A. **69**: 1150 (Oct. 6) 1917.
22. Barcroft, J.; Hunt, G. H. and Dufton, D.: Treatment of Chronic Cases of Gas Poisoning by Continuous Oxygen Administration in Chambers, Quart. J. Med. **13**: 179 (Jan.) 1920.

Anoxia, as it is recognized today, may be divided into four classes, namely the anemic, the anoxic, the stagnant and the histotoxic form. In the anemic type the oxygen tension of the blood is normal but the oxygen content is limited, owing to a deficiency or some functional alteration of hemoglobin. This is best represented by the primary anemias. In the anoxic form, the hemoglobin is unsaturated because of a lowered oxygen tension. The associated reduced tension of carbon dioxide aggravates the condition as it tends to alter further the dissociation curve of oxyhemoglobin. It may result from breathing atmospheres containing a reduced content of oxygen at normal pressures or from any condition in which the alveolar ventilation is reduced. Stagnant anoxia is the end result of cardiac or circulatory failure. The oxygen content and the oxygen tension are essentially normal, but the tissues are inadequately supplied because of a retarded blood flow. This is the condition frequently seen in surgical or traumatic shock. Histotoxic anoxia is essentially a condition in which the cells are incapable of utilizing the available oxygen owing to poisoning. Examples are cyanide, alcoholic and carbon monoxide poisoning.

The direct effects of lack of oxygen have been well described by Barcroft,[23] Haldane [24] and others through studies made at high altitudes and in closed chambers in which the partial pressure of oxygen was reduced. Slight deficiency results in hyperpnea and an accelerated pulse rate. Moderate want is characterized by headache, nausea, vomiting and visual and respiratory disturbances. In acute deficiency there is delirium, fever, coma and eventually death. If the onset of anoxemia is insidious, the symptoms are often comparable to those of alcoholic intoxication. There is a feeling of well-being or exhilaration. Mental function is impaired. Emotional disturbances and amnesia are common. Ataxia and muscular weakness develop and are followed by an ascending muscular paralysis. The special senses are gradually lost, hearing being apparently the last to disappear. Unconsciousness occurs and death ensues.

The effect on breathing by a specific reduction of the oxygen content of the inspired air varies with the person and the speed of the reduction. In normal persons a reduction of 7 per cent is usually required to produce a noticeable effect. In others a similar reduction may produce a noticeable reaction. Ordinarily, a slight deficiency of oxygen acts as a stimulus to respiration. If continued, the increased breathing washes out an excess of carbon dioxide and lowers the alveolar and arterial tension of carbon dioxide, and there is a tendency toward production of an alkalemia. With the level of carbon dioxide reduced, respiration becomes quiet and remains so until the gradual accumulation of carbon dioxide in the blood acts as a stimulus. The cycle is repeated and breathing becomes periodic. If the anoxia is allowed to progress further, the apneic phase is gradually prolonged and death eventually occurs from fatigue of the respiratory center. When oxygen want is induced slowly, as in mountain climbing, and when sufficient time is allowed, acclimatization may occur. The alveolar and arterial tensions of carbon dioxide are substantially lowered owing to the rapid shallow breathing. In order to compensate for the alkalemia, and in order to maintain a high tension of oxygen, the kidneys excrete the excess base. If asphyxia develops rapidly, as may occur when an inert gas is breathed, the initial period of hyperpnea is short and unconsciousness ensues quickly, since the tissues have no oxygen reserve to combat the lowered tensions of oxygen and carbon dioxide.

Similar changes occur in the circulating blood. Incipient anoxia produces dilatation of the coronary vessels [25] and a transient rise in the cardiac output and in the frequency of the pulse rate. These are merely compensatory mechanisms to insure an adequate supply of oxygen to the tissues by an increased blood flow. As anoxia progresses, the cardiac output gradually fails owing to lack of oxygen and the accumulation of waste products in the tissues. The latter is important as it tends to alter the hydrogen ion concentration of the blood, which in turn affects respiration. Breathing is stimulated by a rise and is depressed by a fall of the hydrogen ion concentration. With the former, the compensatory hyperventilation tends to alter the hydrogen ion concentration toward an alkalemia by eliminating the excess of carbon dioxide and carbonic acid. In the latter instance the reverse is true.

In addition to the circulatory and respiratory effects other functions may be impaired. The urinary output is lowered by moderate anoxia.[26] With prolonged want anuria may develop. The emptying time of the stomach is prolonged,[27] contractions [28] are reduced and gastrointestinal secretions are modified.[29] Besides these immediate effects delayed reactions may occur depending on the time and severity of the exposure. The typical nausea, vomiting and depression of mountain sickness may occur eight to twelve hours after exposure. Such experiences were common prior to the use of oxygen in aviation. Barach [30] and others have emphasized the dangers concurrent with flying and recommend the use of oxygen when altitudes of ten to twelve thousand feet are attained.

During many illnesses anoxia frequently complicates the course of disease. By having the superimposed anoxia relieved, the patient is definitely benefited. It is frequently on this basis that oxygen therapy is initiated. In pneumonia, the alveoli are filled with exudate and the lung or part of it is converted into a solid airless organ. As a result, diffusion of oxygen from the air is diminished and the vital capacity of the lungs is lowered. In addition, the presence of hyperpyrexia and toxemia increases the metabolic rate. With metabolism accelerated, the demands of the tissues for oxygen are greater. With the requirement for oxygen increased and the supply decreased, a vicious cycle is established. From a study of clinical records, Binger [31] concluded that there is a definite correlation between anoxemia and mortality in pneumonia. Other observers have confirmed these observations. Early intervention is essential, as lack of cyanosis in the early stages of the pneumonic process does not infer an absence of anoxemia. Stadie [32] has pointed out that the saturation of

23. Barcroft, J. H.: Anoxemia, Lancet **2**: 485 (Sept. 4) 1920.
24. Haldane, J. S.; Kellas, A. M., and Kennaway, E. L.: Experiments on Acclimatisation to Reduce Atmospheric Pressure, J. Physiol. **53**: 181 (Dec.) 1919.
25. Hilton, R., and Eichholtz, F.: Influence of Chemical Factors on Coronary Circulation, J. Physiol. **59**: 413 (March) 1925.
26. Wiggers, C. J.: Physiology in Health and Disease, Philadelphia, Lea & Febiger, 1934, pp. 399-400.
27. Van Liere, E. J.; Crisler, George, and Robinson, Dennis: Effects of Anoxemia on the Emptying Time of the Stomach, Arch. Int. Med. **51**: 796 (May) 1933.
28. Van Liere, E. J., and Crisler, George: Effects of Anoxemia on Hunger Contractions, Am. J. Physiol. **93**: 267 (May) 1930.
29. Crisler, George, and Van Liere, E. J.: The Effects of Anoxemia on Digestive Movements of the Stomach, Am. J. Physiol. **102**: 629 (Dec.) 1932.
30. Barach, A. L.: Pilot Error and Oxygen Want, J. A. M. A. **108**: 1868 (May 29) 1937.
31. Binger, C. A.: Therapeutic Value of Oxygen in Pneumonia, New York State J. Med. **25**: 953 (Oct. 15) 1925.
32. Stadie, W. C.: The Oxygen of the Arterial and Venous Blood in Pneumonia and Its Relation to Cyanosis, J. Exper. Med. **30**: 215 (Sept.) 1919.

the blood with oxygen may drop 10 to 15 per cent below normal before cyanosis is perceptible. This is especially true in anemic patients. Evans [33] states that the efficacy of oxygen is practically in direct proportion to the day on which oxygen treatment is started. In the absence of cyanosis, a pulse rate out of proportion to the degree of hyperpyrexia, the presence of a grayish color and rapid shallow respirations are clearly indicative of anoxia.

In the presence of cardiac disease, impaired function ultimately results in defective circulation and pulmonary edema. Decompensation is accompanied by a lowered arterial and venous concentration of oxygen.[34] Peters and Barr [35] have reported changes in the dissociation curve for carbon dioxide and in the hydrogen ion concentration of the blood in advanced cardiac failure. Siebeck [36] has observed unequal pulmonary expansion in cardiac insufficiency, resulting in an imperfect mixture of the gases in the lungs. Barach [37] has described several cardiac conditions in which oxygen therapy has been beneficial, namely congestive heart failure due to primary cardiac disease, cardiac insufficiency as a sequel to chronic pulmonary disease, acute coronary thrombosis and coronary arteriosclerosis with chronic cardiac pain. In congestive failure due to primary cardiac disease, the most significant effects following inhalation of oxygen were decrease of cyanosis, relief of dyspnea and orthopnea and a sharp rise in the content of carbon dioxide in the blood. Associated changes are increased concentration of arterial oxygen, decrease in the concentration of lactic acid in the blood and decreased pulmonary ventilation. Oxygen therapy in cardiac insufficiency as a sequel to pulmonary disease yielded similar results. Currently, the pain of coronary thrombosis is thought to be due to myocardial ischemia. Lewis [38] has pointed out that pain results when the blood supply of a working muscle is inadequate. Rizer [39] in 1928 noted that the pain could be relieved by inhalation of oxygen. Kissin and Rothschild [40] have induced attacks of anginal pain by lowering the concentration of oxygen in the atmosphere breathed by patients suffering from coronary arteriosclerosis. Levy, Barach and Bruenn [41] have reported decided relief of pain and subjective symptoms in similar patients following administration of oxygen. Patients with chronic cardiac disease such as those showing congenital defects develop a compensatory mechanism early in life and thus do not warrant oxygen therapy unless decompensation or infection supervenes.

An asthmatic attack produces insufficient oxygenation owing to lowered vital capacity, reduced available pulmonary surface for diffusion of gases, increased residual air and increased negative pressure within the thorax. Oxygen therapy alone has not proved satisfactory because the volume of oxygen able to pass by the obstructed areas is small. When oxygen therapy has been combined with the administration of helium, significant benefits have been obtained. The use of helium is based on the fact that in diffusion through small apertures the mean free path of helium is greater than is that of nitrogen.[42] Consequently, oxygen and carbon dioxide diffuse more readily through obstructed pulmonary areas in the presence of helium than in nitrogen. By connecting a delivery tube from a tank of helium and oxygen and from a tank of oxygen by means of a Y tube, the administration of these gases through a Boothby-Lovelace-Bulbulian mask is possible. Barach [43] recommends the use of mixtures of helium and oxygen under pressure. Roentgenographic studies revealed that the smaller bronchi are further enlarged at the end of expiration if positive pressure is used.

Oxygen is being administered after major surgical procedures more frequently than formerly. Moon states that anoxia is a factor of utmost gravity in the operation of the vicious cycle associated with shock. Boothby, Mayo and Lovelace [44] advocate the use of oxygen in concentration of 100 per cent in the treatment of surgical shock because there is an increase of 10 to 15 per cent in the concentration of oxygen in the circulating blood. Under basal conditions hyperthyroidism is frequently accompanied by a slight decrease in the concentration of oxygen in the arterial blood. Following thyroidectomy the administration of oxygen is followed by a definite relief of subjective symptoms. Fine and his associates [45] advocate the use of oxygen in high concentration in the treatment of distention occurring postoperatively on the basis that when pure oxygen is breathed the gradient of diffusion between the nitrogen existing in the tissues and that in the blood increases. Consequently, there is an increased rate of absorption of nitrogen from the tissues into the blood and thence into the air. On this basis the administration of oxygen following encephalography frequently produces a decrease in the severity and duration of the postencephalographic syndrome. Schwab, Fine and Mixter [46] advocate the administration of oxygen both during and after the procedure, even when oxygen is used as the visualizing medium.

The question of dosage in oxygen therapy has received considerable attention. It would seem logical that a concentration should be used which is capable of abolishing the existing anoxia. However, experimental work has shown that animals exposed to concentrations of from 70 to 100 per cent for several days develop pulmonary lesions.[47] Paul Bert [6] first noticed that if animals breathed pure oxygen at several atmospheres pressure they soon had convulsions and died. In man,

33. Evans, J. H., and Durshordwe, C. J.: Indications for Oxygen Therapy in Respiratory Disease, Anesth. & Analg. **14**: 162 (July-Aug.) 1935.

34. Means, J. H., and Newburgh, L. H.: Studies of the Blood Flow by the Method of Kroh and Lindhard, Tr. A. Am. Physicians **30**: 51, 1915. Lundsgaard, C.: Studies of Oxygen in the Venous Blood, J. Exper. Med. **27**: 179, 1918.

35. Peters, J. P., Jr., and Barr, D. P.: Carbon Dioxide Curve and Carbon Dioxide Tension of Blood in Cardiac Disease, J. Biol. Chem. **45**: 537 (Feb.) 1921.

36. Siebeck, R.: Ueber kardiale Dyspnoe, Klin. Wchnschr. **8**: 2121 (Nov. 12) 1929.

37. Barach, A. L.: The Therapeutic Use of Oxygen in Heart Disease, Ann. Int. Med. **5**: 428 (Oct.) 1931.

38. Lewis, Thomas: Pain in Muscular Ischemia: Its Relation to Anginal Pain, Arch. Int. Med. **49**: 713 (May) 1932.

39. Rizer, R. I.: Oxygen in Treatment of Coronary Occlusion: Preliminary Report, Minnesota Med. **12**: 506 (Aug.) 1929.

40. Rothschild, M. A., and Kissin, M.: Production of the Anginal Syndrome by Induced General Anoxemia, Am. Heart J. **8**: 729 (Aug.) 1933.

41. Levy, R. L.; Barach, A. L., and Bruenn, H. G.: Effects of Induced Oxygen Want in Patients with Cardiac Pain, Am. Heart J. **15**: 187 (Feb.) 1938.

42. Visscher, M. B.: The Physiology of Respiration, Bull. Minnesota M. Foundation **2**: 1 (Nov.) 1940.

43. Barach, A. L., and Swenson, Paul: Effect of Breathing Gases Under Positive Pressure on Lumens of Small and Medium Sized Bronchi, Arch. Int. Med. **63**: 946 (May) 1939.

44. Boothby, W. M.; Mayo, E. W., and Lovelace, W. R.: One Hundred Per Cent Oxygen: Indications for Its Use and Methods of Its Administration, J. A. M. A. **113**: 477 (Aug. 5) 1939.

45. Fine, Jacob; Banks, B. M.; Sears, J. B., and Hermanson, Louis: The Treatment of Gaseous Distention of the Intestine by the Inhalation of Ninety-Five Per Cent Oxygen, Ann. Surg. **103**: 375 (March) 1936.

46. Schwab, R. S.; Fine, Jacob, and Mixter, W. J.: The Reduction of Postencephalographic Symptoms by the Inhalation of Ninety-Five Per Cent Oxygen, Arch. Neurol. & Psychiat. **37**: 1271 (June) 1937.

47. Smith, L. J.: The Pathological Effects Due to Increase of Oxygen Tension in the Air Breathed, J. Physiol. **24**: 19, 1899. Karsner, H. T.: The Pathological Effects of Atmospheres Rich in Oxygen, J. Exper. Med. **23**: 149, 1916. Schmiedehausen, P. G.: Die pathologisch-anatomischen Veränderungen der Lungen bei verändertem Saugerstoffgehalt der Atemluft, Inaug. Dissert., Halle, Wischan & Burkhardt, 1909. David, O.: Versuche über den Einfluss sauerstoffarmer Luft auf künstlich geschädigte Lungen, Ztschr. f. exper. Path. u. Therap. **11**: 239, 1912.

Benke and Shaw demonstrated that the continuous administration of pure oxygen at one atmosphere was capable of producing untoward effects after six hours.[48] On this basis oxygen was formerly seldom given in concentrations over 60 per cent. Evans,[33] however, pointed out that the use of such concentrations were inefficient and that higher concentrations were warranted. Sayers found that pure oxygen can be administered for ten hours in man and for sixteen hours in animals without apparent harm.[49] Barach [49] confirmed these observations and recommended that pure oxygen should not be given for more than twelve hours a day. Recently, Boothby, Mayo and Lovelace [44] reported the use of oxygen in high concentrations in more than 800 cases without evidence of pulmonary irritation, but they suggest that the duration of treatment should not exceed forty-eight hours.

Currently there are four popular methods of administering oxygen, namely by means of the intranasal catheter, the mask, the tent and the chamber. Use of an intranasal catheter is an effective method provided the oxygen is efficiently humidified. A flow of 5 to 8 liters provides a concentration of 40 to 60 per cent in the inspired air. To prevent excessive irritation of the nasopharynx and to insure an adequate concentration, the catheter must be well lubricated and properly placed. If it is inserted too deeply there is a tendency for the patient to swallow; if withdrawn too far lower concentrations are obtained at equivalent rates of flow. The best results are obtained by anchoring the catheter at the level of the uvula.[50] If properly controlled, a tent is a satisfactory means for administering oxygen in concentrations up to 60 per cent. To be effective, frequent checks for adequate ventilation, temperature, humidity and concentration of oxygen and carbon dioxide must be made. Unless this is done, the procedure is both costly and dangerous for the patient. In many ways the administration of oxygen in a chamber is ideal. The patient is comfortable and free from the psychologic effect of knowing that he is receiving oxygen. The disadvantages are the initial expenditure and the greater fire hazard. When concentrations above 60 per cent are warranted, administration by means of a mask is the method of choice. The mask is easily applied, few adjustments are necessary and high concentrations may be obtained with a relatively low rate of flow. Either the basal or the oronasal mask may be used. The former seems more desirable from the standpoint of comfort, but the latter is more efficient when oral breathers are encountered.

We have considered oxygen only as a secondary factor complicating the course of a disease. Our ancestors encountered and thought of asphyxia chiefly in terms of drowning and of foreign bodies within the trachea. The development of the gasoline engine, the ever increasing use of coal, oil and gas in industrial and home life, the widespread use of anesthetic agents and the overcrowding of metropolitan areas have added further hazards. In turn, man has responded by obtaining a more thorough knowledge of the principles of resuscitation. Currently, manual resuscitation by the prone pressure method of Schafer and mechanical means by controlled positive and negative pressure are in vogue. There is considerable diversity of opinion as to which offers the maximum in effectiveness.[51] There are many who advocate manual methods since they are available, easy to apply and, with an inexperienced operator, less apt to be detrimental to the patient. Mechanical means in experienced hands have a great deal to offer, especially when artificial respiration must be maintained over a long period of time.

Of the manual procedure, Schafer's method is preferred in this country. The prone pressure position promotes the clearing of the pharynx and trachea of foreign material, is easy to perform and carries a minimal amount of risk to the patient. Increasing pressure over the lower ribs produces expiration, while expiration depends on the elastic rebound of the compressed parts. A recent operation or a pregnancy contraindicates the use of this procedure, the method of choice under these circumstances being that of Silvester. Physiologically the Nielsen "arm lift," which aids both phases of respiration, should produce the best results. Expiration depends on pressure over the shoulder blades, and inspiration is aided by the operator lifting the patient's arms. This provides a maximal expansion of the chest. As pressure over the shoulder blades may prove harmful, Drinker and Shaw [52] have suggested the combination of the prone pressure and the Nielsen method if two operators are available. While one applies pressure over the lower ribs, the other lifts the arms as the pressure is released. Mouth to mouth insufflation has many adherents. It permits an exchange of gases under proper conditions as to temperature, content of moisture and carbon dioxide. Waters and Bennett [53] state that it is the method to employ first in severe asphyxia. They prefer it to either the Silvester or the Schafer procedure. Satisfactory results may be obtained by administration of oxygen or mixtures of oxygen and carbon dioxide by means of a simple inhalator in conjunction with the prone pressure method.

Mechanical resuscitators are of two types: those employing intermittent positive pressure and those providing alternating positive and negative pressure. In the former expiration depends on the recoil of the distended parts, while in the latter the additional aspirating action due to negative pressure aids expiration. The principle involved in both has aroused considerable controversy. It is well known that excessive intrapulmonary pressure may produce irreparable damage. Positive pressure has been condemned by some because the force necessary for inflation in the presence of atelectasis or obstruction exceeds the upper margin of safety. Polak and Adams in experimental work on dogs have used pressures as high as 8 mm. of mercury without apparent harm.[54] In man, pressures of from 30 to 40 mm. of mercury are conceded to be safe. Coryllos [54] advocated the use of pressure, stating that it is the only means whereby successful insufflation with oxygen may be produced when muscular tone is lost. The value of the cupping action due to negative pressure is debatable, some observers holding that it has

48. Beecher, H. K.: The Physiology of Anesthesia, New York, Oxford University Press, 1938, p. 126.

49. Barach, A. L.: Recent Advances in Inhalation Therapy in the Treatment of Cardiac and Respiratory Disease, New York State J. Med. **37:** 1095 (June 15) 1937.

50. Wineland, A. J., and Waters, R. M.: Oxygen Therapy: Insufflation into Oral Pharynx, Arch. Surg. **22:** 67 (Jan.) 1931.

51. Coryllos, P. N.: Mechanical Resuscitation in Advanced Forms of Asphyxia, Surg., Gynec. & Obst. **66:** 698 (April) 1938. Report of the Commission on Resuscitation from Electric Shock, New York, National Electric Light Association, 1913. Proceedings and Resolutions of the Third Resuscitation Commission, Science **48:** 563 (Dec. 6) 1918. Wilson, R. A.; Tarrey, M. A., and Johnson, K. S.: The Initiation of Respiration in the Newborn, Surg., Gynec. & Obst. **65:** 601 (Nov.) 1937. Moncrieff, A.: Respiratory Failure Including So-Called Asphyxia Neonatorum (Goulstonian Lecture), Lancet **1:** 664 (March 23) 1935. Henderson, Yandell: Fundamentals of Asphyxia, J. A. M. A. **101:** 261 (July 22) 1933.

52. Drinker, C. K., and Shaw, L. A.: Modification of the Nielsen Method of Artificial Respiration, J. Indust. Hyg. **17:** 243 (Nov.) 1935.

53. Waters, R. M., and Bennett, J. H.: Artificial Respiration, Anesth. & Analg. **15:** 151 (May-June) 1936.

54. Coryllos, P. N.: Mechanical Resuscitation in Advanced Forms of Asphyxia, Surg., Gynec. & Obst. **66:** 721 (April) 1938.

a harmful effect on the alveoli and prohibits an adequate exchange of gases during expiration by constricting the smaller bronchi too rapidly. The efficiency of both methods may be enhanced by the use of a well lubricated soft rubber intratracheal catheter to assure a patent airway. Prolonged intubation should be avoided, as it is conductive to tracheitis. If used in conjunction with the application of positive pressure a stomach tube should be passed to prevent gastric distention. When artificial respiration must be maintained over a long period, as in the presence of intercostal paralysis, the efficacy of the Drinker or Emerson respirator is beyond question. If the lungs are collapsed or respiration has not been initiated, the apparatus is of little value.

The patient asphyxiated with carbon monoxide presents a rather complex problem. The affinity of carbon monoxide for hemoglobin is two hundred and ten times that of oxygen.[11] It combines readily and forms a more stable compound with hemoglobin than does oxygen. Because of its high affinity for hemoglobin even low concentrations in the inspired air are dangerous. The essential features of carbon monoxide poisoning are lowered concentration of oxygen, reduced tension of carbon dioxide, depressed respiration and loss of bodily heat. The most effective physiologic means for breaking down the combination of hemoglobin and carbon monoxide is offered by the mass action of oxygen; the most effective stimulus is carbon dioxide. In mild poisoning, the use of oxygen alone produces good results, as ventilation is adequate and no further stimulus to respiration is needed. In such cases Sayers and Yant [55] advocate the use of pure oxygen, stating that it is more efficacious than are mixtures of carbon dioxide and oxygen in preventing occurrence of delayed symptoms. As asphyxia progresses, the threshold for stimulation of the respiratory center rises and respiration becomes depressed. The rationale of using carbon dioxide is based on two facts: First, it produces adequate ventilation by its action on the respiratory center; second, it has a desirable effect on hemoglobin, facilitating the release of oxygen to the tissues. Ordinarily, concentrations of 5 to 7 per cent are employed.[56] A discussion of the value of various drugs as respiratory stimulants in asphyxia is beyond the scope of this paper. At present both experimental and clinical evidence seems to indicate that they are of little value.

The first inspiration of the newborn is essentially a resumption of a function previously established in utero.[57] Suppression of this function has been attributed to many factors. Eastman [58] in 1930 reported that the blood of many asphyxiated newborn infants contained a high tension of carbon dioxide and a low content of oxygen. On this basis he suggested that the failure of respiration was due to impairment of the respiratory center from anoxia and not from lack of chemical stimulation. Snyder and Rosenfeld [59] have shown that maternal anoxemia produces a depression of fetal respiration without the preliminary stimulating effect which occurs in adults. When severe anoxia or narcotization occurs, complete cessation may occur. They also observed that lowering the carbon dioxide tension produced respiratory depression, while raising the tension above normal failed to stimulate breathing. In addition to these factors, it must be remembered that at birth cerebral compression, hemorrhage, mechanical interference with the fetal circulation or incomplete dilatation of the lungs may produce or aggravate an existing anoxemia.

The asphyxiated newborn infant should be handled gently and as little as possible. The mouth and nasopharynx may be cleaned of mucus by postural drainage and aspiration with a catheter. If necessary, the catheter may be inserted into the trachea blindly or under direct vision with a laryngoscope. Warm tubbing is advocated, but cold tubbing should never be employed, as the baby's heat must be conserved and not dissipated. If aspiration, application of external heat and cutaneous friction fail to stimulate respiration, oxygen should be given immediately by intermittent positive pressure. In some instances mouth to mouth insufflation may be indicated. Once breathing has been initiated, oxygen should be continued until respirations are full and regular. If respiration continues to lag or if pulmonary ventilation is deemed inadequate, the infant should be transferred to an incubator equipped as a chamber for the administration of oxygen.[60] Wasson,[61] Van Reuss [62] and Henderson [63] have reported that frequently complete expansion of the lungs may not occur for several days. Therefore, continuation of treatment during this period is essential.

COMMENT

A knowledge of the efficacy of the administration of oxygen has been gained through the efforts of many investigators. Regardless of the method employed, ultimate success of treatment with oxygen depends on early intervention. The reserve supply of oxygen within the body is capable of maintaining life for only a few minutes. Once this supply is exhausted, irreparable damage to the central nervous system may occur within a comparatively short time. Delay in instituting artificial respiration or in administering oxygen may result in death or in the production of a deranged mind within a sound body.

ABSTRACT OF DISCUSSION

DR. ALVAN L. BARACH, New York: I am pleased that oxygen therapy is about to be formally introduced as a part of anesthesiology. It seems fitting that the specialty of anesthesia, which includes relief of pain, should extend itself to relief of dyspnea. Oxygen therapy exercises the effect of reducing the volume of breathing in anoxemic dyspnea. Its special value is in maintaining a rich oxygen supply to the tissues of the body, primarily to the brain. As the authors point out, the brain is the most sensitive organ to oxygen want. Helium is a light gas, which, when mixed with oxygen, can be breathed through narrow orifices at a pressure approximately one-half that required for the movement of either air or pure oxygen. This fact has been made use of in the treatment of asthma and localized obstruction. It has been pointed out that the viscosity of helium is slightly greater than nitrogen and that, if helium was to pass through a tube that was prolonged so that frictional resistance took place, the function of helium would not be

55. Sayers, R. R., and Yant, W. P.: The Elimination of Carbon Monoxide from Blood by Treatment with Air, with Oxygen, and with a Mixture of Carbon Dioxide and Oxygen, Pub. Health Rep. **38:** 2053 (Sept. 7) 1923.

56. Heller, E.; Killiches, W., and Drinker, C. K.: The Evaluation of Five and Seven per Cent Carbon Dioxide Mixtures as Respiratory Stimulants, J. Indust. Hyg. **11:** 293 (Nov.) 1929. Drinker, C. K., and Shaughnessy, T. J.: The Use of 7 per Cent Carbon Dioxide and Ninety-Three per Cent Oxygen in Treatment of Carbon Monoxide Poisoning, ibid. **11:** 301 (Nov.) 1929. Haggard, H. W., and Henderson, Yandell: Treatment of Carbon Monoxide Poisoning, J. A. M. A. **77:** 1065 (Oct. 1) 1921.

57. Snyder, F. F., and Rosenfeld, Morris: Intra-Uterine Respiratory Movements of the Human Fetus, J. A. M. A. **108:** 1946 (June 5) 1937.

58. Eastman, N. J.: Fetal Blood Studies: Oxygen Relationships of Umbilical Cord Blood at Birth, Bull. Johns Hopkins Hosp. **47:** 221 (Oct.) 1930.

59. Snyder, F. F., and Rosenfeld, Morris: Direct Observations of Intra-Uterine Respiratory Movements of the Fetus and the Rôle of Carbon Dioxide and Oxygen in Their Regulation, Am. J. Physiol. **119:** 153 (May) 1937. Footnote 57.

60. Warnock, E. H., and Tovell, R. M.: Oxygen Therapy and Resuscitation, Anesthesiology **1:** 187 (Sept.) 1940.

61. Wasson, W. W.: A Roentgenographic Study of the Infant Chest as Seen at Birth, J. A. M. A. **83:** 1240 (Oct. 18) 1924.

62. Van Reuss, A. R.: Diseases of the Newborn, New York, William Wood & Co., 1929, p. 304.

63. Henderson, Yandell: Incomplete Dilatation of the Lungs as a Factor in Neonatal Mortality, J. A. M. A. **96:** 495 (Feb. 14) 1931.

advantageous. The main use of helium is in respiratory obstruction, in which it has the special physiologic value of lowering the pressure in the chest required for the movement of air in and out of the lungs. Positive pressure is used not only in asthma and in localized obstruction but in edema of the lungs, and this is of special importance at this time, when we are faced with the possibility of war gas poisoning. Edema of the lungs occurs not only as a complication of certain medical and surgical illnesses but also during anesthesia. It has been found that a pressure of 5 or 6 cm. of water, applied to the inside of the lungs by inhaling oxygen through a hood or through a mask, will stop exudation of serum, frequently within a short period. One has to bear in mind that excess pressure will prevent blood from entering into the right heart. But pressures of 5 and 6 cm. of water will in many instances prevent edema of the lungs, and that is something to remember in case one ever comes to a point where irritative gases cause an increased exudation of serum.

DR. FREDERICK A. D. ALEXANDER, Albany, N. Y.: There are some three thousand references in the literature to gas therapy and resuscitation. The authors have picked from this mass of information the most pertinent and the most important. It seems to me that oxygen therapy needs no brief at this time. It is thoroughly established and recognized everywhere. I wonder if we might not to better advantage think more of resuscitation, which, although it is much older than gas therapy, has been more or less taken for granted. More of our efforts, more of our thoughts should be given to resuscitation. As Dr. Barach has suggested, we may need to know a great deal more about resuscitation within the next few months or years. I should like to present a reclassification of the various types of oxygen want. All are familiar with Barcroft's classification of anoxia: anoxic anoxia, anemic anoxia, stagnant anoxia and histotoxic anoxia. The term anoxia is as incorrect as was the term asphyxia generally applied to oxygen want or as was the intermediate term anoxemia. There is no such thing as anoxia in clinical medicine. Any patient who has no oxygen in the blood stream cannot possibly survive. I propose the classification based on the site of the disturbance of the transport of the physiologic gases, with the term "hypoxia" rather than anoxia: atmospheric hypoxia, respiratory, cardiocirculatory, hemic and histotoxic: atmospheric, such as is seen occasionally in anesthesia; respiratory, as in upper respiratory obstruction or at the alveolocapillary membrane or in peripheral respiration insufficiency; cardiocirculatory, in circulatory disturbances where the difficulty is in the heart or in the vessels; hemic, such as we might see with anemia or with the use of the dyes where the hemoglobin has been, temporarily at least, prevented from transporting oxygen.

DR. RALPH T. KNIGHT, Minneapolis: I should like to ask Dr. Barach to amplify one of his statements with regard to the pressure, so that I will understand it more clearly. He showed us that a slight increase in pressure very much increases the passage of either helium-oxygen or oxygen alone through small passageways. If that is true, it seems to me that this increased pressure would also impede the exit from the lungs and would therefore impede ventilation. If we are using a pure oxygen, this would not interfere with the physiology to any extent except that it would reduce the output of carbon dioxide. If we are using helium and oxygen, it occurred to me to wonder whether in such an instance the helium would not accumulate in the lungs to the detriment of the presence of oxygen.

DR. BARACH: Patients with emphysema or asthma during the period of distress manifest a very severe dyspnea, breathing out against partially closed lips. I once had the occasion to ask such a man to open his mouth and breathe, and he swiftly went into an even more violent dyspnea. That was largely responsible for the use of positive pressure in our clinic. Dr. Swenson and I put iodized oil into the bronchi of patients with asthma and then had them breathe naturally and under positive pressure; we showed by x-ray films an increase in the diameter of the bronchi during expiration as a result of this positive pressure reflected backward through the bronchial tree, which tended to keep the bronchi open. There is an increased effort during expiration to exhale the gas against a positive pressure. This, however, is an effort which has peculiar advantages to the patient not only in keeping his bronchi open but in preventing edema of the lungs. I have mentioned in an article in THE JOURNAL on the use of helium the physiologic advantages of grunting and groaning. If one sees a patient with lobar pneumonia in dyspnea, one is impressed with the enormous positive pressure developed during the expiratory grunt, which we have measured in a tracheotomized subject. It may go as high as 20 mm. of mercury, very often 10 or 15, during expiration. That pressure against the capillary wall prevents oozing of serum. I had the misfortune once to give such a man, who I thought was suffering from severe dyspnea, enough morphine to stop completely his expiratory grunt and witnessed the development of the edema of the lung within a period of three quarters of an hour afterward. The pulmonary ventilation is the same or slightly lower with positive pressure. The tidal air comes in, 500 cc., but it goes out in such a way, owing to the opening of the tracheobronchial tree by pressure, that a more uniform ventilation of the lungs takes place, especially in areas of the lung that may have been closed by partially collapsed alveolar ducts and plugged bronchi.

DR. RALPH M. TOVELL, Hartford, Conn.: I should like to mention the physical principles involved in the administration of helium. I quote Visscher from an article of his entitled "The Physiology of Respiration," published in the November 1940 issue of the *Bulletin of the Minnesota Medical Foundation*: "The use of helium is based on the fact that, in diffusion through small apertures, the mean free path of helium is greater than is that of nitrogen." This is an interesting concept that had been appreciated by Barach.

TUBERCULOSIS CASE FINDING

A PRACTICAL AND SUCCESSFUL PROGRAM FOR NONMETROPOLITAN AREAS

THEODORE L. BLISS, M.D.
Director of Richland County Case-Finding Clinic
AKRON, OHIO

In the literature of tuberculosis case finding there are only a few reports dealing with nonmetropolitan areas. Probably the main reason for this lack is the absence of case-finding programs in most such areas. Yet there is as much need for effective tuberculosis control in nonmetropolitan areas as in areas of highly concentrated population. Hence I present this report on a case-finding clinic in successful operation for five years in a nonmetropolitan county in Ohio. Richland County has a population of approximately 74,000, equally divided between the one urban district of Mansfield and the rural districts.

Late in 1935 Dr. Millard Hanson, then the health commissioner of Richland County, sought and obtained funds from the local tuberculosis association to establish a case-finding clinic. He asked me to take charge of the program. A set of regulations was drawn up which made it an integral and permanent function of the health department and provided for the active participation of the private physicians in the county. These regulations were submitted for approval and passed by the county medical society. The clinic which was established is intended to be a chest disease clinic rather than exclusively a tuberculosis clinic. Private physicians are invited to refer any patient with evidence of a pathologic condition of the chest that otherwise could not be definitely diagnosed, as well as patients in whom they suspect tuberculosis. Thus the clinic is able to aid the physician to solve his problems in diagnosis of diseases of the chest, and at the same time it provides an opportunity for examination of the group of patients known

Read before the Section on Preventive and Industrial Medicine and Public Health at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 4, 1941.

to be the most fertile source of tuberculosis. The clinic is scheduled regularly and provides each patient with a roentgenogram of the chest, pertinent laboratory tests and a physical examination of the chest by the clinic physician. Only patients referred by a physician or by the health commissioner are accepted by the clinic. They are classified as suspects. In order that the patient-physician relation may be maintained, the results of the examinations are mailed to the referring physicians and are not given to the patients.

There is another group of clinic patients, the tuberculosis contacts. The regulations permit the clinic nurse to visit the family of a tuberculous patient to urge the contacts to be examined. This is surely a matter of primary importance. Yet the private physician cannot be held responsible for this job, either because he does not fully appreciate its value or because he is not in a position to carry it out. If the contacts are under 12 years of age they are given a tuberculin test, and only contacts with a positive reaction have roentgenograms made of the chest. Since it is also essential to follow up the contacts, they are asked to return for recheck examinations at varying intervals for varying periods of time determined by the epidemiologic factors in the individual case. When a patient presents evidence justifying a diagnosis of inactive tuberculosis he also returns for periodic recheck examinations. When, however, a patient is found to have active tuberculosis the report to the referring physician includes recommendations for treatment but his further observation is not considered within the province of the case-finding clinic, since according to state law he is entitled to aid from the general tax funds.

The health department provides the services of a nurse exclusively for the clinic. Obviously, the success of the program depends on the cooperation of the physician in private practice, the health commissioner and the tuberculosis association.

In order to measure the results of this case-finding program several criteria have been selected.

1. Is the clinic actually investigating a reasonable percentage of the reported cases of tuberculosis in Richland County? In the first year of the clinic in only 56 per cent of the 48 cases of tuberculosis reported to the health department was diagnosis made in the clinic, while in the fifth year in 93.8 per cent of the 49 reported cases diagnosis was made there.

2. Is the management of the clinic economically sound? This is of fundamental importance and may be measured by the number with tuberculosis found in each hundred patients examined. I shall also consider the percentage with disease of the chest other than tuberculosis, since the clinic is primarily a chest disease clinic. If the incidence of tuberculosis among the patients examined is too high it indicates that the clientele is so highly selected that it does not include a great many of the very persons for whom one is looking, namely all the persons in a given district who have tuberculosis. Conversely, if the incidence of tuberculosis is too low it indicates that the wrong persons are being examined and that the cost per case found is unjustifiably excessive. During the five years of operation of the Richland County clinic 1,270 new patients were examined, 175 (13.7 per cent) of whom had active tuberculosis. Of the 175, 155 had pulmonary tuberculosis. The yield for the five years is too high, although the rate has been decreasing each year since the clinic was founded. This high rate is not an index of an excessive incidence of tuberculosis in Richland County, since the death rate during the past five years has averaged 24 per hundred thousand. However, it shows that physicians must be encouraged to refer a larger number of patients to the clinic for examination. In addition to the 175 patients with active tuberculosis, 47 were found to have inactive pulmonary tuberculosis and 156 nontuberculous pulmonary disease, making a total of 378 with some kind of pathologic condition of the chest, or an incidence of 29.7 per cent among the 1,270 new patients examined. The nontuberculous pulmonary diseases included bronchitis, nontuberculous pleurisy, pneumonitis, empyema, bronchiectasis, abscess, carcinoma, silicosis and cystic disease.

3. Has there been an increasing percentage of patients whose disease has been diagnosed in an early stage? The tuberculous patient with incipient disease may be considered as probably noninfectious and the patient with moderately advanced disease as possibly infectious, while the patient with far advanced disease is almost certainly infectious. My aspiration is to attain a falling percentage of patients with far advanced disease and a rising percentage with incipient disease. During the five years the percentage with far advanced disease among the patients having pulmonary tuberculosis has decreased from 77 to 43, and the percentage with incipient disease has risen from 13 to 34. This is progress in the right direction.

4. Has it been profitable to examine the contacts? Among the contacts who have tuberculosis, the percentage with incipient disease should be large, even though a relatively small number have tuberculosis. Among both new patients and patients returning for recheck examinations during the five year period, 31 contacts were found to have tuberculosis, of whom 18 (58 per cent) had the disease in its incipient stage. In the group of suspects 144 had tuberculosis, 32 (29 per cent) in the incipient stage. Thus the incidence of incipient tuberculosis is two times greater among the contacts than among the suspects. This is convincing proof of the importance of examining contacts in the attempt to discover the disease in the incipient stage.

5. Has the program stimulated public interest? Since the case-finding program is supported by the sale of Christmas seals, the total annual sales should offer an index to public interest. Each year the sales have increased. In 1940 the per capita sale in Richland County was three times the average for the five years preceding the founding of the clinic, and in 1940 was 60 per cent above the per capita sales in the state, whereas in the five years prior to establishment of the clinic the average per capita sales in Richland County had been only 12 per cent above the average for the state as a whole. Another example of the public's approval of the program is the passage of a tax levy to provide more funds for the treatment of tuberculous patients. The finding of many new patients requiring treatment resulted in increased demands for money from the general tax receipts. In order to meet these needs the county commissioners submitted to the electorate at the 1938 elections a proposed five year 0.5 mill tax levy to be used exclusively for the treatment of tuberculous patients who were legal residents of Richland County. The levy was approved and provides an annual revenue which is five times the average annual appropriation for the treatment of tuberculous patients during the ten years preceding the founding of the clinic.

The following lessons may be derived from the Richland County experience:

1. There is no reason to defer the setting up of a case-finding program because there is no sanatorium in the district. That the case-finding clinic is only a part of the tuberculosis control program is true. To complete the control program, the care and rehabilitation of the tuberculous patient must be provided for. But I am firmly convinced that a local sanatorium is neither a prerequisite nor a necessity for developing either a case-finding clinic or a complete control program. In fact, I believe that the tuberculosis hospital as a county project is not economically sound except in metropolitan areas. But the need for a case-finding program in nonmetropolitan areas does exist. I believe that case finding is the horse that pulls the cart of the control program.

2. The program should be based on the county unit and should be operated as a permanent and integral part of the county health department, and, if any exist, of the city health departments. The county unit is of workable size. The health departments possess established organizations. Tuberculosis is a communicable disease, and measures for its control are the responsibility of the health department.

3. The program should be run in cooperation with private physicians in essentially the manner outlined. The finding of a communicable disease such as tuberculosis is not likely to attain highest effectiveness in any other way, surely not without the expenditure of much larger sums of money per case found. With the private physician cooperating by sending his patients suspected of having disease of the chest to the clinic for examination, the most fertile field for discovering cases can be exploited. Thus there is a logical and reasonable division of labor between the private physician and the clinic, with neither encroaching on the other's domain and each supplementing and complementing the other.

4. The clinic physician must be a specialist adequately trained in the characteristics of diseases of the chest and familiar with the epidemiology of tuberculosis. He does not necessarily have to be a resident of the county. In fact, a good many difficulties can be avoided if he is not in competition in his private practice with physicians practicing in the clinic area.

5. With such a program as I have outlined, it is possible to keep the cost per case found within reasonable limits and still approach an adequate coverage of the area. Aided by the repeated examinations of contacts my clinic is discovering an increasing percentage of cases of tuberculosis in the incipient stage, which is as vital to the effective control of the disease as to the hope of cure for the individual patient.

6. Lastly, it is possible—and desirable—to educate the public in the control of tuberculosis at the same time as the actual diagnosing goes forward. The finding of cases offers concrete evidence of the presence of the disease and demonstrates the possibility of controlling it. It cannot be too strongly emphasized that the creation of an enlightened and intelligent attitude toward the control of tuberculosis is one of the chief functions of any clinic. The way to treat any communicable disease is to bring it into the open and explain to the public how it is caused and how it can be prevented. Once the public understands what must be done and that it is possible to do it economically and without fuss, it will gladly lend its assistance to a program of control.

I think it best to obtain funds for case-finding work from the sale of Christmas seals, because the average citizen is interested in the fate of the dollar which he spends for them. After a favorable public attitude so necessary for effective work is created, tax funds will probably be provided for the continuation and the necessary and reasonable expansion of the control program. I am firmly convinced that the New York state plan offers the best ultimate solution for the control of tuberculosis in the nonmetropolitan counties of Ohio and probably in most states. But it should not and will not materialize until enough of the nonmetropolitan counties have paved the way with sound case-finding programs.

This report describes one concrete attempt to solve the problem of tuberculosis control in nonmetropolitan counties and is presented with the hope that physicians and health officers may be encouraged to set up similar programs. The Richland County program almost certainly does not represent the final answer to the problem. But its success so far makes me believe that it is a long step in the right direction.

175 South Main Street.

ABSTRACT OF DISCUSSION

DR. ROBERT E. PLUNKETT, Albany, N. Y.: Physicians in charge of chest clinics too frequently fail to appreciate the importance of establishing appropriate relationship with practicing physicians. Nothing is more basic and more important than that the chest clinic have the active support of the practicing physicians. The more completely a clinic service is integrated with the field of medical practice, the greater will be the returns in profitable case finding and control. In the absence of such integration, optimum results can never be achieved. This statement is made after more than twenty years' experience in a service in which one of the requisites is cooperation with the medical profession. Such cooperation has resulted in virtually 100 per cent of the physicians practicing in the areas served by the New York State Department of Health clinics actively participating in our tuberculosis case finding and follow-up program. Dr. Bliss has wisely recognized the importance of this fundamental factor. It is obvious that because of this recognition the results which he has achieved have in no small part been due to this common understanding and the resultant good will of the practicing physicians. Superficially, Dr. Bliss's statement that 13.7 per cent of 1,200 new patients who were examined showed evidence of active tuberculosis is somewhat startling. It is apparent that a yield so much higher than the average in clinic service indicates some unusual condition. This point is emphasized by Dr. Bliss when he states that the rate is not an index of an excessive incidence of tuberculosis in Richland County. In other words, this percentage yield is probably due to the highly selected group of patients who had been referred to his clinics for examination. I am confident that as his program is extended, and it should be, this percentage yield will become much smaller but none the less profitable to the public health. It has been my experience that except for highly selected segments of the population, such as Dr. Bliss reports on, the percentage yield in clinically significant pulmonary tuberculosis has been found to be greater among patients referred to a clinic because of history of contact, plus those referred because of symptoms, than in any other group. It is impossible to overemphasize the importance of tuberculosis in the adult age groups. The New York State Department of Health has recognized the need for supplementing routine clinic service by the roentgenographing of groups of the adult population. When the present national emergency arose, plans were formulated to roentgenograph all men before they were inducted into military service as a part of the National Selective Service Act. An extensive study prompted the division to conclude that of the available methods for producing chest roentgenograms, namely 14 by 17 inch celluloid films, 14 by 17 inch paper roentgenograms and 4 by 5 inch and 35 mm. roentgen-photographic films, the 4 by 5 roentgen-photographic film is the most economical and most practical method for screening large groups of people.

ADIPOSOGENITAL DYSTROPHY

RALPH H. KUNSTADTER, M.D.
CHICAGO

A great deal of skepticism concerning endocrine therapy of the adiposogenital dystrophies has arisen because of extravagant claims and ill defined indications. This has led to the treatment of patients who did not present true endocrinopathies [1] and the use of endocrine products which are now known to be ineffective.[2]

Many children with small genitalia are unjustly labeled "pituitary type," Fröhlich's syndrome or adiposogenital dystrophy. We must not overlook the fact that the most common cause of obesity is overeating.[3] We must realize that pronounced obesity in itself may conceal the actual size of the genitalia so that a false impression may result unless careful examination is carried out. We must also consider the limits of normal; that small genitalia in the prepuberal period may signify simply a physiologic retardation or delay in development, possibly at the expense of rapid growth (which is common in many of these children), a retardation that may undergo spontaneous correction.

What then is adiposogenital dystrophy? Babinski [4] and Fröhlich over forty years ago described cases of obesity [5] with hypogenitalism secondary to expanding lesions in the region of the pituitary body. A few years later Bartel applied the term adiposogenital dystrophy to this syndrome but other investigators were not convinced that the destruction of the pituitary alone was responsible for this condition.[5] In the past twenty years a great deal of experimental evidence has indicated that the pituitary and the region of the hypothalamus are concerned with growth, sexual development, certain phases of metabolism and obesity, although the exact relationship of these structures to obesity is not clearly understood. In all probability adiposogenital dystrophy is a dysfunction of the pituitary gland involving both the anterior and the posterior lobes, originating in the pituitary, the adjacent hypothalamic region or both. Bauer [6] argues against the impairment of certain hypothalamic centers or of the pituitary and believes that "the frequent finding of small or incompletely descended testis can be explained by the underlying abnormal genetic factor which causes obesity and which affects the endocrine glands in general and the gonads in particular." Could not the abnormal genetic factors be responsible for the endocrine disturbance? Although in Fröhlich's original patient pituitary tumor was present, intracranial hemorrhage, encephalitis, possibly toxic suppression or degeneration of the pituitary or adjacent structures following infectious diseases of childhood may result in this clinical syndrome. There are many instances in which no pathologic lesion was demonstrable clinically or at autopsy, and it has been my experience that the majority of cases are in this group. From a clinical point of view, children who show definite evidence of endocrine dysfunction, that is, hypogenitalism associated with pronounced obesity which cannot be explained on the basis of overeating in a broad sense, may be considered as presenting adiposogenital dystrophy.

Adiposogenital dystrophy occurs more often in females than in males, but the latter are seen more frequently because genital infantilism is more conspicuous. The onset may occur at any age. Rarely there is a history of excessive weight at birth. Often there is a rather sudden and progressive increase in weight, beginning between the ages of 7 and 10 years, which is out of proportion to the food intake. The clinical picture of typical so-called Fröhlich's syndrome or adiposogenital dystrophy is familiar to all and does not need elucidation.

These patients are usually endowed with normal intelligence and may be indolent and good natured. Not infrequently they are introspective because of self consciousness.

There may be an increased carbohydrate tolerance due to decrease in the secretion of an insulin-antagonizing hormone.[7] Schwarz, Neuman and Baum [8] found a high concentration of fat metabolism hormone in their cases. The basal metabolic rate is variable. There may be fluid retention or the other extreme, diabetes insipidus, due to disturbed water and salt metabolism. There may be an elevation of blood chlorides and uric acid and a diminution of specific dynamic action of proteins.

Roentgenograms of the skull usually reveal no abnormal changes. Occasionally enlargement and erosion of the sella indicative of an expanding lesion, calcification within the sella, or a sella considerably smaller than normal may be present.

DIAGNOSIS

The diagnosis of adiposogenital dystrophy must be made with caution. Many patients do not present the typical picture described, and it is difficult to interpret borderline cases. A consideration of the developmental history is important in regard to disturbance of somatic as well as mental development.

The genitalia of the male patient should be examined in the recumbent as well as in the upright position, so that excessive adipose tissue may be retracted and migratory testes manipulated in the scrotum and their size estimated. Rectal examination is important. In the older male the prostate and seminal vesicles, and in the female the pelvic organs may be infantile. Hormone assay of the urine may suggest an endocrine disturbance. In primary hypogonadism there may be diminished excretion of either androgens or estrogens with an increased excretion of gonadotropic substance, whereas in primary pituitary deficiencies there may be a diminished excretion of both.

TREATMENT

The treatment of adiposogenital dystrophy depends on the age of the patient and the presence or absence of organic disease.

The aim of endocrine therapy is restoration of function by stimulation or replacement. In treating the prepuberal patient several factors must be taken into consideration. Stimulation is desired and untoward effects are to be avoided. Excessive hormone may suppress the pituitary and also cause atrophy of the gonads

Read in the Panel Discussion on Endocrine Disorders of Adolescence before the Section on Pediatrics at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

1. Weiner, Sidney C.: J. Clin. Endocrinol. **1:** 134 (Feb.) 1941. Bartel.[3]
2. McCullagh, D. R., and Bowman, W. E.: Endocrinol. **27:** 525 (Sept.) 1940.
3. Bruch, Hilde: J. Pediat. **18:** 36 (Jan.) 1941.
4. Babinski, J. J.: Rev. neurol. **8:** 531, 1900.
5. Bruch, Hilde: The Fröhlich Syndrome, Am. J. Dis. Child. **58:** 1282 (Dec.) 1939.
6. Bauer, Julius: M. Rec. **151:** 89 (Feb. 7) 1940.
7. Young, F. G.: Endocrinol. **26:** 347 (Feb.) 1940.
8. Schwarz, Herman; Neuman, A. B., and Baum, Harry: Endocrinol. **26:** 605 (April) 1940.

as the result of direct action.[9] Less frequently precocious development [10] with premature cessation of growth may occur. Because of these dangers both estrogenic and androgenic hormones should be avoided in the prepuberal period. Stimulation of the gonads by the combined administration of anterior pituitary extract and either chorionic or equine gonadotropin should be attempted. The former may supply a gonad stimulating fraction not present in either of the latter. In view of the metabolic disturbance present in these patients, I believe that anterior lobe extract containing not only the gonad stimulating but possibly the metabolic fraction is preferable. If there is an associated diabetes insipidus, posterior lobe extract (pitressin) may be administered.

For the puberal patient when it is desirable for cosmetic and psychologic as well as physical reasons to produce a more rapid appearance or improvement in the secondary sex characteristics, androgenic or estrogenic substance should be combined with the gonad stimulating preparations, the latter also possibly offsetting any local degenerative effect that the androgens or estrogens might have on the gonads.

In the castrate, whether surgical, cryptorchid or congenital, gonad stimulating hormones are of no value and it may be necessary to administer androgenic or estrogenic substances in large doses indefinitely.

The mode of administration and duration of treatment depend on the age of the patient and the response. In the prepuberal male or female the treatment may be a matter of weeks or months before either subjective or objective improvement results. Treatment should be interrupted at various intervals as refractoriness may develop.

In the rare case of intracranial tumor or cyst involving the pituitary, roentgen therapy or surgical intervention may offer some hope of improvement.

Dietary management and correction of faulty eating habits are essential in all obese patients regardless of the etiology.[11] A high protein, low caloric diet should be prescribed.[12] If there is evidence of water retention, sodium chloride should be restricted and potassium chloride or acetate substituted (the latter also having a diuretic effect). I have found that amphetamine sulfate is a valuable aid in controlling the abnormal appetite of many of these patients.[11] It has been my experience that, unless there is definite evidence of hypothyroidism, thyroid is of little value and may even be harmful. Also it frequently stimulates the appetite.

CONCLUSION

It should be repeated that not all obese children outgrow their fatness and not all children with hypogenitalism improve spontaneously. If one reviews the case reports of adult hypogonadism, frequently one finds that the disturbance dates back to childhood. If the history is considered, if a careful physical examination is performed and if the laboratory results are properly evaluated, I do not believe that obese but otherwise normal children will be subjected to unnecessary endocrine therapy.

104 South Michigan Avenue.

9. Moore, C. R.: New England J. Med. **212**: 422 (March) 1935; The Testis Hormone, J. A. M. A. **104**: 1405 (April 20) 1935.
10. Kunstadter, R. H.: Endocrinol. **23**: 661 (Nov.) 1938.
11. Kunstadter, R. H.: J. Pediat. **17**: 490 (Oct.) 1940.
12. Hess, J. H., and Kunstadter, R. H.: M. Clin. North America **22**: 161 (Jan.) 1938.

HYPOTHYROIDISM IN CHILDHOOD

E. KOST SHELTON, M.D.
LOS ANGELES

For purposes of clarity, let us assume that there are three types of hypothyroidism during childhood, namely cretinism, juvenile myxedema and borderline hypothyroidism. As a matter of fact they are all one and the same disorder modified according to (*a*) the severity and (*b*) the length of time during which the patient has been subjected to the deficiency. Because we are dealing with a hormone whose purpose it is not only to develop the organism during the most plastic period of its existence but also to maintain it in functional equilibrium, one can readily appreciate the diagnostic variables to be encountered in a disruption of such a mechanism at any age.

Let us first consider the degree of severity. Until recently the more conservative observers were unwilling to concede any form of hypothyroidism which could not easily be classified under cretinism or myxedema. When analyzed closely, such a stand is not tenable. In common with most other secreting organs there is a margin of safety between the physiologic requirement of the thyroid and its functional capacity, but there is a threshold below which the gland may be said to be embarrassed rather than actually devoid of function. Such a mild disturbance encountered at any age but more commonly in early adolescence cannot be classified under cretinism and rarely develops myxedema.

The element of time is of equal importance. A mild degree of hypothyroidism for a short period, at any stage of development, will likely not be reflected objectively in the somatic or mental makeup. Over a period of years, however, even a mild degree of thyroid deficiency must leave its mark on both the soma and the psyche. A severe degree of deficiency, as that which follows total ablation of the gland (but which also occurs spontaneously), may completely incapacitate the patient within a few months, while partial or moderate deficiencies may go unrecognized for years. Thus the frequent confusion regarding the early diagnosis of other than the most severe case.

Classic hypothyroidism or cretinism and juvenile myxedema have been described for so many years by so many observers, without any new or startling innovations, that I shall refrain from going into detail in a consideration of this type of case. Suffice it to say that the classic hypothyroid child is still the dwarfed, lethargic, edematous, pot bellied, alabaster skinned, constipated imbecile it has always been. But we must keep this picture in mind since the study of disease entities begins with the classic case and hypothyroidism is no exception. Most observers are now agreed on the consistency with which certain laboratory and roentgen data are discovered in such classic cases.

BASAL METABOLIC RATE

Either in a closed chamber or by the open method, when estimated under ideal conditions (usually impossible) by any method of calculation, the oxygen consumption will be found to be much lower than in a similar group of normal children. In other words, the basal metabolic rate will be found to range between minus 20 and minus 40 per cent.

Read in the Panel Discussion on Endocrine Disorders of Adolescence before the Section on Pediatrics at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

BONE AGE

Every child with severe untreated hypothyroidism will show retardation of osseous development when the disorder has existed for a period long enough to be reflected in the somatic makeup.

BLOOD SERUM CHOLESTEROL

Most, if not all, observers in recent years have demonstrated blood serum cholesterol values ranging from 50 to 200 per cent above the average normal. Individual variations and different methods of determination make it difficult to arrive at actual figures. In my practice the abnormal values usually range from 250 to 500 mg. per hundred cubic centimeters.

URINARY EXCRETION OF CREATINE

Children with severe hypothyroidism, untreated, excrete considerably less creatine in the urine than a similar group of normal children.

THE MILD (OR BORDERLINE) CASE

If this is all true and, generally speaking, it is, although there are some exceptions, why would it not be easy to make diagnoses in mild or borderline cases by a mere modification of the foregoing? The basal metabolic rate is both mechanically and mathematically difficult to obtain in the average child, particularly the mentally inapt child. Children, technicians, machines and methods of calculation vary and so, unfortunately but inevitably, do results. It is therefore not a practical diagnostic procedure in the young child. In older, more tractable, children and in adolescence it is a part of the diagnostic procedure. Even here, too much dogmatism is employed in an interpretation of the findings. I have seen numerous children with very low readings who I am convinced did not suffer from hypothyroidism. I have seen children with normal or moderately high readings who have profited by thyroid administration. Never make a diagnosis or guide your dosage for any length of time by an estimation of the basal metabolic rate alone. Some individuals are veritable thyroid eaters and may take many times the normal physiologic dose without objective alteration of the metabolic processes. Others appear most sensitive to thyroid administration. It has been my experience that children who really need thyroid are more sensitive to it than the normal, particularly in the early weeks of treatment.

Bone age continues to be the most objective evidence of the developmental status of the child; but, while children with true hypothyroidism of long standing will have retarded osseous development, the reverse is not necessarily true. In my original paper on this subject some ten years ago and repeatedly since, I have advised that the interpretation of such a finding should be subjected to the same criticism as any other diagnostic procedure. It has been my misfortune, however, to see as much diagnostic dogmatism placed on shades of variation from the average normal in this subject as in the case of the basal rate. It may be employed safely as follows: If the child is retarded two years or more according to some accepted standard (and all of the standards are within a few months of one another), try to prove or disprove hypothyroidism in the patient by every other means. Do not use the wrist or any other roentgenogram as the sole diagnostic criterion. On the other hand, even severely hypothyroid patients will have no reflection of their difficulty in the osseous development unless the condition has been present for a number of years. So it is even possible for a child with severe but recent hypothyroidism to have a normal bone age.

The blood serum cholesterol is not pathognomonic of mild or borderline hypothyroidism because values vary even in the classic case. When all other causes of high blood cholesterol have been ruled out, values have been found to vary in a large group of normal children. Persistent high blood cholesterol values otherwise unaccounted for (in my practice over 220 mg. per hundred cubic centimeters) are very suggestive, however, particularly if corroborated by other physical or laboratory criteria.

I have estimated the urinary creatine excretion in over a thousand children and still rest on my original findings. The creatine excretion is very low or absent in the classic hypothyroid child. But it is also low or absent occasionally in children who are dwarfed or puny but who otherwise do not fit into the classic hypothyroid group. Therefore, just as the bone age and the cholesterol, the creatine excretion is informative but not diagnostic.

Variations from the classic clinical picture are important diagnostic criteria. There may be something in the history, the appearance of the skin, the temperature, the pulse, the hair, the stature, the posture, the teeth or the voice to initiate the investigation. Overweight is a very poor diagnostic sign.

Finally we come to the therapeutic response. Classic hypothyroid children, with few exceptions, respond promptly to ingested thyroid. The oxygen consumption increases, the basal metabolic rate rises, the bone age in relation to chronological age increases, the blood serum cholesterol falls, the urinary excretion of creatine increases, the patient's height increment is enhanced, the infantile characteristics disappear and cerebration improves. But what of the mild or borderline case? Here as well the symptoms subside, but mere subjective improvement is not enough to satisfy the astute observer. For this reason every attempt should be made to arrive at some conclusion before beginning treatment. Too many children with developmental anomalies, birth injuries, mongolism and wholly unallied disorders, to say nothing of constitutionally inadequate children, are put carelessly on thyroid without an adequate investigation.

Amelioration of symptoms and alteration of laboratory and roentgen data are therefore diagnostic criteria of major importance. But even here we have our diagnostic difficulties. Evans has shown that thyroid is ineffective when administered to hypophysectomized animals. This is probably why some dwarfs fulfilling most of the criteria of hypothyroidism do not respond to thyroid administration. Also Smith and others have shown that administration of an anterior pituitary fraction complements the action of thyroid at least so far as the growth process is concerned. For these reasons we need a potent pituitary fraction to enhance our therapeutic armamentarium in the treatment of complicated hypothyroidism. To my knowledge such a product is not on the market.

The dose of thyroid is another variable, but something between one-half and three grains (0.03 to 0.2 Gm.) a day has been an adequate range in my practice. It may be given in a single dose once a day. All reputable brands of desiccated thyroid are efficacious,

but the clinician should familiarize himself with one brand before prescribing thyroid indiscriminately. In my judgment, thyroid should be administered alone and not with other usually inert glandular material. Dosage should be regulated by repeated clinical observations and occasional laboratory tests.

CONCLUSION

The diagnosis of mild or moderate hypothyroidism consists of a series of tests, all of which are highly informative but none of which are conclusive. When considered with the history and physical picture, one is frequently able to arrive at a fairly definite conclusion. The objective therapeutic response to thyroid may be necessary to establish a diagnosis, although congenital absence or disease of certain elements of the anterior pituitary may nullify the effect of thyroid even in a hypothyroid child. Treatment of all forms of childhood hypothyroidism should be early, adequate and persistent. Complete rehabilitation is possible under ideal conditions.

760 North Beverly Glen Boulevard.

GYNECOLOGIC PROBLEMS OF ADOLESCENCE

EMIL NOVAK, M.D.
BALTIMORE

No sharp time limits can be fixed for the period of adolescence, which represents a transition phase between puberty and full maturity. The latter themselves are periods subject to no fixed chronological laws. The changes of puberty involve far more fundamental phenomena than the mere appearance of the first menstruation (menarche). Many of these phenomena are carried over into adolescence. As a matter of fact, the gynecologic and endocrine problems of adolescence are essentially those of puberty. Moreover, they are practically all of endocrine causation, emphasizing again, if it needs further emphasis at the present day, how fundamental a role endocrinology plays in modern gynecologic practice.

Important as are the endocrines in the anatomic and physiologic phenomena of adolescence, there is one other factor which can never be overlooked in the interpretation of functional disorders at this epoch. I refer to the psychologic element. Even in the minds of the public, the term "adolescent psychology" carries with it a distinctive connotation, as popularized, for example, in the penetrating literary delineations of Booth Tarkington. It indicates a period of romanticism and idealism, impressionability, hero worship, day dreaming and other such traits. This transient phase, amusing as it may be to the child's elders, can never be overlooked as a possible influencing factor of adolescent functional disorders. As a matter of fact, it may lead to consequences which in the occasional case are not only not amusing but may actually be tragic.

If, for example, the girl's hero worship is centered on a distant movie star, the infatuation is certainly more amusing than harmful. But if, in a lower stratum, a girl bestows her idolatry on the neighborhood bully, a bitter price may be exacted by the object of her hero worship. The purely psychologic aspects of adolescence, which must envisage a consideration of the newly awakened force of sex consciousness, will be considered by others in this symposium, but they frequently obtrude themselves into the interpretation of the functional gynecologic problems of adolescence.

From a purely physiologic point of view the period of adolescence may be brief or virtually nonexistent, as in many girls menstruation and ovulation may be normal in character and rhythm from the beginning. The anatomic changes, on the other hand, are always gradual. In some girls the appearance of the first menstrual period is preceded for many months by increasing development of the breasts, genital and axillary hair growth, rounding of the figure and other secondary sex manifestations. In others this preliminary phase is brief, the general developmental changes occurring chiefly after rather than before the menarche itself.

ABNORMALITIES IN HEIGHT

During adolescence there is an increasing restraint on pituitary growth hormone activity as a result of the increasing activity of the ovarian hormones. Various abnormalities in this hypophysiogonadal balance may bring about excessive or deficient skeletal growth, with varying degrees of gigantism or dwarfism. Aside from their purely objective aspects, such abnormalities often have profound psychologic repercussions, with the development of complexes characterized by morbid self consciousness concerning the affliction. Psychotherapy must often play an important part in the management of these conditions. The unusually tall girl, moreover, is prone to develop postural difficulties because of her tendency to stoop to make herself seem shorter. These postural difficulties are often later expressed in backache, lower abdominal discomfort, and even in the form of dysmenorrhea.

DYSMENORRHEA

The role of the psyche in the production of primary dysmenorrhea is unquestionably a most important one, although only a minority of gynecologists accept the view that all cases of this disorder are of psychogenic etiology. The best prophylactic against this type of dysmenorrhea is proper training of the girl, preferably by her mother, as to what menstruation signifies and what it does not signify and, above all, that the function is not characteristically associated with pain and that it should interfere but little with the life activities of the girl. Unfortunately this ideal training is not available to most young girls in the puberal and adolescent years. Many mothers are loath to discuss these problems with their daughters and only too often are themselves ignorant of simple facts about the menstrual function. If any advice is given, it is far more apt to consist of admonitions tending to make the girl coddle herself during menstruation. Thus the impressionable youngster is apt to look on menstruation as a time when she should actually be unwell, and a step is taken toward the development of primary dysmenorrhea. Various forms of psychic trauma to which the adolescent girl is so often exposed may accelerate her progress toward dysmenorrhea.

Almost as important, perhaps, is the constitutional factor, as expressed in the general health level of the girl, and her habits as to exercise, recreation, study, food and sleeping hours. The foundation of many cases

From the Department of Gynecology, Johns Hopkins Medical School.
Read in the Panel Discussion on Endocrine Disorders of Adolescence before the Section on Pediatrics at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

not only of dysmenorrhea but also of general neuroticism and invalidism is laid in adolescence. The young girl who is so ambitious to excel in her scholastic work that she neglects recreation, sunshine and proper sleep in this developing epoch of her life often pays the penalty later on as a menstrual invalid of one type or another.

These statements may seem trite and old fashioned now that the endocrine explanation of primary dysmenorrhea occupies the limelight of discussion. The mechanism of primary dysmenorrhea, however, is still a mystery in spite of the fact that studies of the effects of the ovarian hormones on the uterine musculature have appeared to have a close bearing on the problem. By all but a few dissenters estrogen is accepted as the normal stimulant of uterine contractility, while progesterone is the normal inhibitant. If, as seems likely, the pain of dysmenorrhea is the result of exaggerated painful contractions of the uterine musculature, the natural suggestion would be that dysmenorrhea is brought about by a relative excess of the estrogen effect or a deficiency of progesterone. The factor of sensitivity of the individual uterine musculature to these hormones must also be considered, though there is no way to evaluate this clinically.

The hormone treatment now so popular in dysmenorrhea is based on the aforestated premises. It consists in the employment of substances which, so far as the uterine muscle is concerned, are supposedly antiestrogenic in their effect (preparations of testosterone) or of preparations which, from the same point of view, are synergistic with progesterone (preparations of progesterone, testosterone and chorionic hormone). Few gynecologists are altogether satisfied with the results of such therapy in spite of the fact that it appears to be of genuine value in many cases. It cannot be too strongly emphasized that dependence on endocrine treatment alone, with disregard of psychic and constitutional measures, is certainly not justified in the present state of our knowledge and is quite sure to result in a large proportion of failures.

Many years ago, when the roles of estrogen and progesterone were first being discussed, I called attention to two features of primary dysmenorrhea which seemed paradoxical. One of these is the fact that in certain conditions in which there is a relative and perhaps decided excess of estrogen and perhaps a complete absence of progesterone, and in which one might therefore expect an exaggerated contractility of the uterus, pain is characteristically absent. This is conspicuously the condition of affairs in most cases of functional bleeding.

The second puzzling feature was the fact that, in a considerable proportion of cases, primary dysmenorrhea does not begin at the menarche but a considerable time, from a few months to several years, after the first menstruation.

Can we reconcile these facts with the present day endocrine theory of dysmenorrhea? In the largest group of cases of functional bleeding ovulation does not occur, and more recently we have learned that ovulation may remain in abeyance for a considerable time after the inauguration of menstruation. Thus it appears that primary dysmenorrhea is a disease of ovulating women and that the anovulatory cycle, prone though it is to exhibit aberrations characterized by excessive bleeding, is not associated with pain. The correctness of this assumption has been established by Sturgis and Albright [1] by means of endometrial studies, although others like Wilson and Kurzrok [2] had previously expressed this view. Sturgis and Albright were able to prevent primary dysmenorrhea for a particular cycle by inhibiting ovulation with large doses of estrogen in the early part of the cycle. Their good results have been repeated by others, though not with such invariable success.

These advances have not solved the riddle of dysmenorrhea either as to its mechanism or as to its treatment. They have, however, emphasized the real importance of the endocrine factor. By means of large doses of estrogen begun early in the cycle it appears possible to inhibit ovulation and to make the next period painless, but repetition of the treatment, aside from other obvious disadvantages, is often unsuccessful. Conceding that primary dysmenorrhea is characteristically a disease of ovulating women, we are still in the dark as to its underlying cause. Various hypotheses have been suggested, such as that of imbalance between the two ovarian hormones, with perhaps resulting abnormalities in the partition of the estrogenic pinciples, but nothing of a definite nature has been established, so that we shall have to struggle with this common and distressing problem of dysmenorrhea for some time to come.

AMENORRHEA

This is not the place to attempt a complete discussion of the possible causes of amenorrhea in adolescence. Here we most commonly have to deal with the primary type, but the secondary variety is not rare in girls still within the adolescent phase. From a practical point of view the chief admonition would be not to resort too quickly to ovarian or gonadotropic therapy in young girls. The first menstruation not infrequently does not appear until the age of 16, and even the age of 17 is not exceedingly rare for the menarche. In my own work endocrine therapy is rarely resorted to before the age of 17, except perhaps for the employment of small doses of thyroid. This does not mean that other measures, such as those directed toward raising the constitutional health level in every possible way, are to be neglected, for this would be most unwise. Nor does it mean that an obvious or demonstrable endocrinopathy, such as hypothyroidism or dyspituitarism, should not be studied and treated according to accepted methods.

The fact remains, however, that a great many girls of 15 or 16 are unnecessarily subjected to "shots" of all sorts, that such treatment in itself is generally ineffective, and that when menstruation does occur following such treatment it would probably have occurred without it. Every conservative gynecologist is pessimistic about the organotherapy of endocrinopathic amenorrhea in general, and too early and unnecessary resort to such treatment in young girls may engender undesirable psychologic sequelae. In the treatment of all menstrual difficulties in adolescent girls, the physician can perform an incalculable service by reassuring explanations not only to the patient but to the mother as well, since the latter so often has wrong ideas as to the possible dangers of amenorrhea in itself. Especially important is it to stress the fact that the mere absence of menstruation is in itself harmless, for on this point many wrong ideas are still prevalent.

1. Sturgis, S. H., and Albright, Fuller: Mechanism of Estrin Therapy in Relief of Dysmenorrhea, Endocrinology **26**: 68-72 (Jan.) 1940.
2. Wilson, Leo, and Kurzrok, Raphael: Studies on Motility of Human Uterus in Vivo, Endocrinology **23**: 79-86 (July) 1938.

FUNCTIONAL BLEEDING

Excessive menstrual bleeding is a frequent occurrence in young girls, and with few exceptions it is of functional nature. The diagnostic problem is far simpler at this age epoch than it is in the case of abnormal bleeding near the other extreme of menstrual life, when so many other possible factors, some of serious import to the patient, must be considered. Simple rectal examination will usually, in the case of young girls, eliminate the relatively rare neoplastic lesions which might at times cause excessive menstruation. While this should be done, few mistakes will be made if the functional nature of the bleeding is taken for granted.

The common mechanism of adolescent functional bleeding consists, in brief, in a failure of ovulation, with resulting excess of the estrogenic hormone and an absence of progesterone. In other words, it represents an exaggeration of what happens in the anovulatory type of cycle so often seen in the early years of menstrual life. The fact, for example, that a girl begins to menstruate at 14 does not necessarily mean that she is susceptible of fertilization if insemination should occur, for she may not begin to produce eggs for a considerable time after the menarche. That the anovulatory type of cycle of which functional bleeding is so often an aberration is not infrequent in the early months or even years of menstrual life has been well established, but there are no available data as to its relative incidence as compared to the common ovulatory cycle.

The disorder therefore revolves around the failure of ovulation, of whose hormone causes we still know little, but there is little doubt that the underlying disturbance is in the anterior hypophysial lobe. No very effective method of inducing ovulation in the nonovulating human female is as yet available in spite of the enthusiastic reports of some writers as to the efficacy of the equine gonadotropic preparations (pregnant mare serum). The immediate purpose of most methods of treatment is to limit the abnormal bleeding rather than to induce ovulation, and for this purpose three chief types of hormonal preparations have been employed: progesterone, testosterone and the chorionic hormones found in pregnancy urine. In general the results must be evaluated as far from satisfactory but in a considerable proportion of cases sufficiently effective to tide the girl over her frequently temporary phase of excessive bleeding.

The tendency in most cases of functional bleeding seen in adolescence is toward readjustment of the endocrine balance with then the occurrence of ovulation and the establishment of essentially normal bleeding. For this reason it is a wise policy to abstain from endocrine therapy in the frequently observed cases of mild degree in which the blood loss is so moderate as to produce no demonstrable degree of anemia. Unfortunately, more active measures are often made necessary by the profuse and even exsanguinating bleeding which may occur. Curettage may be indicated for the immediate control of the bleeding, temporary though this relief may be, while hematinic measures and sometimes transfusion are not infrequently called for. More radical measures, such as hysterectomy or radiotherapy, are rarely to be thought of, although many excellent gynecologists resort to small doses of radiotherapy in the more severe cases. In general, however, radiologists agree with gynecologists that radiotherapy should be a method of last resort, as even very light dosage may produce permanent effects in the occasional case.

OBESITY

The problem of the fat girl is a common one in gynecologic practice, especially since so many of this group of patients suffer also from amenorrhea or other menstrual abnormalities. The management of the amenorrhea cannot be separated from that of the obesity. This is not to say that they are invariably associated, for this is the case in only a proportion of the patients. As with obesity in general, the milder forms may be of exogenous causation, with overeating as the most important factor. In the majority of patients who are brought for medical advice, however, endocrine factors of one sort or another are concerned.

Careful study will often permit of classification on a reasonably sound basis. In the majority of instances of pronounced obesity the cause will be designated as pituitary, hypothalamic or a combination of the two factors (hypophysiohypothalamic). It is in the latter two groups that we must place most of the extreme cases, as when girls of 16 and 17 reach a weight of 200 pounds or more. In obesity of this extreme grade, menstruation may be entirely normal, scanty, irregular or absent altogether, indicating presumably the degree of participation of the pituitary sex hormones.

The fact that both menstruation and ovulation may be entirely normal, that disturbances of fluid balance are not infrequently present, that obesity of this type may occur with tumors in the parapituitary region and as a sequel of encephalitis or basal meningitis—all these point circumstantially to the fact, for which there is also experimental evidence, that the seat of trouble is in certain parapituitary areas of the midbrain, probably in the hypothalamic region. For such types of obesity there is no direct endocrine treatment, but efforts may be made, usually unsuccessfully, to treat the amenorrhea. Aside from this the employment of such measures as low caloric diet, exercise, massage and perhaps the cautious employment of thyroid would seem to represent our whole armamentarium.

In the more moderate grades of obesity, we have often to do with pituitary, thyroid or ovarian factors. This is not the place to elaborate on the available methods of study and management of such cases. One point seems to me well worth stressing. Puberty, like the menopause, represents a phase at which there occurs a readjustment of the endocrines. As a result of this reshuffle, many a girl who has been obese before puberty assumes essentially normal proportions afterward, and menstruation may be established normally. On the other hand, puberty may bring about an accentuation of a preexisting endocrinopathy with persisting and increasing obesity and often amenorrhea.

The moral is that we should be slow to resort to endocrine therapy in prepuberal or puberal patients, and that treatment should be restricted to such limitation of diet as the active life of a young girl will justify, together with exercise. The cautious employment of thyroid, especially when there is evidence of hypothyroidism, is indicated in some cases.

The morbid self consciousness of many fat girls concerning their affliction must be combated with reassuring psychotherapy, and especial care should be taken to warn against the extreme and inadequate dieting to which many youngsters subject themselves in their desperate efforts to reduce. Aside from other dangers, the ovaries are extremely sensitive to nutritional and vitamin deprivation, and this in itself may be a cause of amenorrhea, as I have observed in a good many cases.

HIRSUTISM

While not as common as some other adolescent disorders, there are few afflictions which can be the cause of more mental distress than hirsutism, especially when it involves the face. The adrenal cortex and the pituitary appear to be incriminated in most of these cases, but no effective endocrine treatment is as yet available. In the frequent mild form involving the upper lip alone, relief may be obtained by the painful, time consuming and expensive method of electrolysis, while in other cases depilatory and other cosmetic technic is available. In the extreme grades frequent close shaving may be necessary.

Hirsutism may be noted in girls who otherwise are typically feminine, with normal menstruation and ovulation, well formed breasts and normal genitalia. In itself it is not to be looked on as evidence of a masculinization tendency, as so many of these sufferers wrongly fear. It is only when combined with other intersexual manifestations, such as hypertrophy of the clitoris, flat breasts and a deep voice, that it is to be looked on as a part of a masculinization syndrome.

BREAST ABNORMALITIES

Unusually flat breasts in otherwise normally developed girls are the source of frequent unhappiness, as is the opposite condition, in which the breasts are of unusually large or even enormous size. The fact that both of these two conditions are so often noted in otherwise normal girls, with normal menstruation, points to the fact that the causative factor is not an abnormal deficiency or excess of the ovarian hormones on which breast development depends. Rather does it indicate that the breast tissues of the particular girl are for some reason unduly refractory or abnormally sensitive to the estrogenic growth stimulus.

While the flat breasted girl is often treated with some form of estrogen administration, either hypodermic or percutaneous, the results are not usually significant, and my experience has been that they are rarely better than can be obtained by such simple measures as frequent massage, designed to promote growth by increasing the blood supply.

Nor is there any satisfactory endocrine therapy for the abnormal hypertrophy occasionally seen as a local exaggeration of the puberal secondary sex phenomena. When not too pronounced, the problem can be reasonably well taken care of by some form of breast uplift. In the extreme forms, in which the breasts may hang to or beyond the waist, plastic operations may be necessary, but these require special skill and experience to secure satisfactory results.

SUMMARY

There are few disorders, developmental or functional, which are distinctive of the period of adolescence, but the rather special psychology of the adolescent girl gives these disorders an added importance at this prase of life, and the type of management may influence greatly the later life of such patients. Among the major problems discussed are the menstrual disorders, but others frequently encountered, and briefly considered in this paper, are abnormalities of body growth, obesity, abnormalities in breast development and hirsutism. A reshuffle of the endocrines takes place at the puberal epoch, and conservatism must be the guiding motif in endocrine therapy at this phase of life and also in adolescence.

26 East Preston Street.

ENDOCRINE TREATMENT OF CRYPTORCHISM

WILLARD O. THOMPSON, M.D.
AND
NORRIS J. HECKEL, M.D.
CHICAGO

In 1939 we [1] reported on the status of glandular therapy in patients with undescended testes and compared our results with those reported in the literature. In contrast to the 61 per cent of successful results of other observers we were able to produce descent in only 20 per cent of our cases and in only 27 per cent of those occurring in patients under 16 years of age. We were not able to produce descent in any instance in which the testis was intra-abdominal, although a high incidence of successful results (55 per cent) had been reported in patients with testes of this type. We concluded that glandular therapy would produce descent only in those testes which would descend by the time of puberty without treatment; namely, those which were not retained by mechanical factors. Nevertheless the treatment appeared valuable because it made it possible to determine at an early age whether operative procedures would be necessary or not in order to get the testis into its normal environment. Our investigation of this problem has continued and new patients have been observed. Several of the patients previously reported on have undergone orchiopexy. We may therefore check the accuracy of our previous conclusions and make any additions that may be warranted by further experience.

DATA

We have observed the effect of treatment in 89 undescended testes in 67 patients varying in age from 10 months to 37 years. Fifty-two patients were under 16 years of age. In 25 patients the condition was originally bilateral, but in 3 of these the position of one of the testes had been corrected by orchiopexy before the patient reported to us. Fifty-three of the patients showed normal body contour, 8 patients were of the Fröhlich type and 6 patients were eunuchoid. Eunuchoidism did not become evident until the time of puberty. The secretion of sex hormone at this time apparently exerts an important influence on the growth of the epiphysial centers in the vertebrae as well as in the long bones, thus affecting the relation between the length of the trunk and the length of the extremities. Of 9 patients over 16 years of age with bilateral cryptorchism, 6 patients were eunuchoid in type while the remainder showed normal development of the penis, musculature and skeleton. All of them, however, showed some evidence of sex hormone deficiency.

Preparations Used.—This study is limited to our experience with chorionic gonadotropin. We used the products of four manufacturers.[2] Several patients who were treated with other types of glandular products or by surgery alone are not included here; neither are patients with migratory testes.

From the Departments of Medicine and Surgery, Rush Medical College of the University of Chicago and the Presbyterian Hospital.

Read in the Panel Discussion on Endocrine Disorders of Adolescence before the Section on Pediatrics at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

1. Thompson, W. O., and Heckel, N. J.: Undescended Testes: Present Status of Glandular Therapy, J. A. M. A. **112**: 397 (Feb. 4) 1939.

2. A. P. L. of Ayerst, McKenna and Harrison, Follutein of E. R. Squibb and Sons, Korotrin of Winthrop Chemical Company and Pranturon of the Schering Corporation.

RESULTS

Our proportion of successful results has remained about the same, namely 24 per cent for the total number of undescended testes and 27 per cent for the total number of patients. Since the response bears some relation to the age of the patient and the location of the testis before treatment, our results may be discussed under these headings.

Relation Between Age and Response.—A higher percentage of successful results was noted before than after the age of puberty (table 1). Thus, in 34 patients 10 years of age and under, descent occurred in 14 of 44 undescended testes (32 per cent) while in 15 patients 16 years of age and over, descent was observed in only 4 of 24 undescended testes (17 per cent). The difference is not so great if the patients 11 to 15 years of age are included in the younger group. The higher incidence of descent before puberty may be readily explained. At the age of puberty hormonal factors normally come into play which cause descent of all those testes not retained by mechanical factors. As a result, the incidence of undescended testes in untreated patients is less after the age of puberty, and the only patients in whom any response to chorionic gonadotropin might be expected after this age would be those with hypopituitarism and associated hypogonadism.

TABLE 1.—*Relation Between Age of Patient and Response to Treatment with Chorionic Gonadotropin*

Age, Years	Number of Patients	Number of Patients Showing Descent of Testis	Number of Undescended Testes	Number of Testes Showing Descent
0 - 5	8	2	12	2
6 - 10	26	10	32	12
11 - 15	18	3	21	3
16 and over	15	3	24	4
Totals	67	18	89	21

Only 3 of our patients showed descent after the age of puberty, and all of them were eunuchoid men 23, 25 and 33 years old respectively. In the 23 year old patient 1 testis descended from about the midcanal, and in the 25 and 33 year old patients 1 descended from the abdomen and 2 from a position over the external oblique. Descent of the testes in these instances was associated with genital growth. In other words, by administering chorionic gonadotropin we had supplied artificially stimulation to the testes which normally comes into play spontaneously at the time of puberty. When cryptorchism in men is associated with primary hypogonadism, descent of the testis may sometimes be produced with testosterone propionate.

Relation Between Position and Response.—In table 2 it may be seen that there is a definite relation between the position of the testis and the response to glandular therapy. Our highest percentage of successful results was noted when the testis was in the canal or between the lower end of the canal and the upper end of the scrotum (36 per cent). Up to the present time we have been able to produce descent in only 2 of 34 intra-abdominal testes with chorionic gonadotropin (6 per cent) in spite of the fact that reports in the literature indicate descent in 55 per cent of such cases on the average. Testes deflected in abnormal positions have responded fairly well to treatment. Thus 35 per cent of those deflected over the external oblique have descended as did 1 of 4 that were directed toward the perineum. In this respect our results differ from those which we have previously reported.[1] Perhaps in some instances a testis which was outside the canal could be deflected so easily over the external oblique that we erroneously concluded that this was its position. Several factors may be involved in the relationship between anatomic position and response to glandular therapy. When the testis remains in the abdominal cavity for a considerable length of time it may be damaged and incapable of showing much response to treatment. In occasional instances we have been unable to find any testis within the abdominal cavity at operation. Testes deflected in abnormal positions might be expected to progress farther in their abnormal direction following treatment, but this is certainly not always the case.

It follows from these observations that:

1. If the testis is in the canal or outside the canal, the results of glandular therapy are fairly satisfactory. Our data have not been analyzed to determine the relation between the position in the canal and the response to glandular therapy, but it is our impression that the lower the testis lies in the canal the better the response to treatment.
2. If the testis is in the abdominal cavity, it is unlikely that descent will occur with glandular therapy.

FINDINGS AT OPERATION IN UNSUCCESSFUL CASES

Twenty-five patients in whom the testes failed to descend with chorionic gonadotropin have undergone an orchiopexy. In 5 the operation was bilateral, making a total of 30 orchiopexies. As in our previous smaller series, anatomic factors were found which may have been related to the failure of descent. These included:

1. Fibrous bands which not only immobilized the testis but shortened the cord by producing adhesions to surrounding structures (all patients).
2. Abnormal direction of the peritoneal process (11 patients), which in 9 patients was turned upward over the external oblique, in 1 lay over the rectus sheath and in 1 was directed toward the perineum.
3. Absence of the external ring (1 patient).
4. Absence of testis (2 patients).

Until more precise information is available concerning the normal mechanism of descent it will be impossible for us to give a satisfactory explanation of our findings at operation in unsuccessful cases. In many instances the peritoneal process extended a considerable distance below the level of the testis, and it is of course well known that during normal development the peritoneal process precedes the testis into the scrotum. It is possible that fibrous bands may have prevented the descent of the testis along the peritoneal process. The abnormal deflection of the peritoneal process in many of the patients suggests that during embryonic development the scrotal fibers of the gubernaculum may have failed to appear. However, it is necessary to preserve an open mind on this problem because some testes that were deflected over the external oblique descended during the administration of chorionic gonadotropin.

PITFALLS IN DIAGNOSIS

There are two important diagnostic considerations:

1. The determination of whether or not the patient has true cryptorchism, and
2. The recognition of the accurate position of the testis.

It is important to exclude patients with pseudocryptorchism. (We have a separate series of 40 such patients.) This condition is present when the testis moves spontaneously or can be made to move between the scrotum and a higher level. These migratory testes

move permanently into the scrotum at the time of puberty and should not be included in a study of true cryptorchism. In some instances of pseudocryptorchism the testes may retract into the abdomen, simulating intra-abdominal cryptorchism. Since we used larger doses of chorionic gonadotropin than many observers, the only way we can account for our lower percentage of successful results is by difference in diagnostic criteria. In order to exclude migratory testes and determine the correct location of the testis, it is desirable to examine the patient in the upright position on at least two different days. Testes which lie over the external oblique are usually freely movable just under the skin. A hernial sac is not infrequently associated with failure of descent of the testis and usually extends below the testis. Occasionally the attention of the patient or the mother is directed to an undescended testis by the sudden development of a strangulated hernia.

CAUSES OF CRYPTORCHISM

The response to glandular therapy and the findings at operation suggest that there are two causes for cryptorchism:

1. A hormonal deficiency.
2. Anatomic abnormalities.

The testis normally moves into the scrotum during the ninth month of fetal life. It appears that both hormonal and anatomic factors are involved. It has not been clearly established what these hormonal factors are in intra-uterine life. The presence of large quantitites of chorionic gonadotropin in the urine of the pregnant mother and the production of descent with this material after birth suggest that it may play an important role in the descent of the testes in utero. When undescended testes move into the scrotum at the time of puberty without treatment, the stimulus appears to come from the anterior lobe of the pituitary. In descent of the testis it is necessary to consider not only hormonal factors but also the anatomic integrity of the parts involved. According to some observers the gubernaculum plays an important role. Thus absence of scrotal fibers and persistence and overdevelopment of other fibers such as those that are attached to the external oblique, base of the penis and the perineum may account for some abnormal deflections.

STATUS OF GLANDULAR THERAPY

We can see no reason to modify the conclusion previously reached; namely, that chorionic gonadotropin causes descent only of those testes which would descend at the time of puberty without treatment, i. e. those not retained by mechanical factors. Since this appears to be the case, what is the virtue of treatment with chorionic gonadotropin? There are several arguments in its favor:

1. The testis can function normally only in the environment of the scrotum.

2. It is therefore logical to assume that the earlier the testis is brought into the scrotum the more likely it is to be normal.

3. With glandular therapy it is possible to determine at an early age whether operative procedures are necessary or not. If there is no mechanical obstruction the testis will descend with glandular therapy alone (about one fourth of the cases).[3] If it does not descend, operative procedures are necessary and are facilitated by the enlargement of the parts produced by glandular therapy. In spite of all the work done in the past twelve years on the treatment of undescended testes, the notion still persists in many quarters that the condition is of no consequence and will be outgrown. We are unable to subscribe to this point of view.

The chief argument against glandular therapy is that in order to produce descent it is usually necessary to produce some genital growth and it is possible that premature stimulation may adversely affect the function of the testis in later life and stimulate premature closure of the epiphyses. After following patients very carefully during the past seven years, our impression is that the treatment is beneficial instead of harmful when properly carried out. The majority of boys with undescended testes appear to be slightly frail, delicate and somewhat effeminate. With chorionic gonadotropin their appetite improves, their muscles become larger and firmer and they become more vigorous and masculine. However, chorionic gonadotropin is a very potent therapeutic agent and must be used carefully. Its chief danger as we see it is the production of excessive genital growth, which can be avoided if the patients are carefully followed during treatment. Growth of the genitalia stops as soon as the stimulus is withdrawn. The main problem now seems to be how early treatment should be started. Most of the patients that are referred to us are more than 3 years old and the thing that impresses us is that the undescended testes in these patients remain small after being brought into the scrotum either by glandular therapy or by operative procedures. Perhaps the testes were defective in the beginning and perhaps this was the reason for their failure to descend, but it is also possible that the testes were small because they had remained too long in their abnormal environment. Since the normal environment of the testis is the scrotum and since the testis normally moves into the scrotum during the ninth month of fetal life, it is possible that better results would be achieved if treatment was carried out at a much earlier age, perhaps shortly after birth.

TABLE 2.—*Analysis of Our Results in Treatment of Undescended Testes with Chorionic Gonadotropin*

					Type				Location									
					Bilateral		Unilateral		Intra-Abdominal		Inguinal		Ectopic					
													Deflected Over External Oblique Muscle		Deflected Over Rectus Sheath		Deflected Toward Perineum	
Age, Years	No. of Patients	Total No. of Undescended Testes	Total No. Descended	Percentage Descended	No. Before Treatment	No. Descended	No. Before Treatment	No. Descended	No. Before Treatment	No. Descended	No. Before Treatment	No. Descended	No. Before Treatment	No. Descended	No. Before Treatment	No. Descended	No. Before Treatment	No. Descended
10 mo. to 37 yr.....	67	89	21	24	44	10	45	11	34	2	33	12	17	6	1	0	4	1
10 mo. to 15 yr.....	52	65	17	26	26	6	39	11	19	1	28	11	13	4	1	0	4	1
16 to 37 years.....	15	24	4	17	18	4	6	0	15	1	5	1	4	2	0	0	0	0

3. If there is an associated hernia, operative procedures will be necessary in any case.

The effective dose of chorionic gonadotropin varies from 100 to 500 international units three to six times a week. In successful cases the testis usually descends within eight or nine weeks, although much longer periods of treatment are necessary in some instances. In order to determine whether or not the treatment will be effective, it usually must be continued until some genital growth has been produced. If operative procedures prove necessary, they should be carried out at once. If glandular therapy is discontinued for any length of time beforehand, regression in the size of the genitalia may increase the technical difficulties of the operation.

Pituitary and equine gonadotropin are not very suitable therapeutic agents, although theoretically desirable, because they contain both follicle stimulating and luteinizing factors, whereas chorionic gonadotropin contains principally luteinizing material. In actual practice the pituitary and equine gonadotropins available at present produce little stimulation of the male gonad.

Since chorionic gonadotropin produces its effect by stimulating the testis to produce male sex hormone, it might be considered desirable to administer male sex hormone itself in the treatment of undescended testes. However, this material damages the seminiferous tubules [4] and should not be used unless both testes are incapable of responding to stimulation.

SUMMARY

The evidence available suggests that there are two causes for failure of descent of the testis:

(*a*) A glandular deficiency.
(*b*) Anatomic abnormalities.

Since the testis can function normally only in the environment of the scrotum, it is logical to assume that the earlier it is brought into the scrotum the more likely it is to be normal.

With glandular therapy it is possible to determine at an early age whether operative procedures are necessary or not. If there is no mechanical obstruction, the testis will descend with glandular therapy alone. If it does not descend, operative procedures are necessary and are facilitated by the enlargement of the parts produced by glandular therapy.

Chorionic gonadotropin is the most satisfactory therapeutic agent in most instances.

Treatment involves the intelligent combination of glandular therapy and surgical procedures.

The age of the patient and location of the testis have some bearing on the success of glandular therapy. The incidence of successful results is higher before than after the age of puberty.

We were able to produce descent in only 2 of 34 intra-abdominal testes. The majority of the successful results occurred in testes which were in the inguinal canal or outside the canal.

It is still uncertain how early treatment should be carried out, but our observations suggest at a very early age.

It is important to distinguish between true cryptorchism and pseudocryptorchism (migratory testis). Migratory testes descend spontaneously at the time of puberty and require no treatment. Their inclusion in studies of glandular therapy exaggerates the percentage of successful results.

700 North Michigan Avenue—122 South Michigan Avenue.

4. Heckel, N. J.: The Influence of Testosterone Propionate on Benign Prostatic Hypertrophy and Spermatogenesis: A Clinical and Pathological Study in the Human, J. Urol. **43**: 286 (Feb.) 1940.

ABSTRACT OF DISCUSSION

ON PAPERS OF DR. KUNSTADTER, DR. SHELTON, DR. NOVAK AND DRS. THOMPSON AND HECKEL

DR. THEODORE O. ELTERICH, Pittsburgh: This symposium is important and timely. Faddists, charlatans and well meaning but inadequately informed physicians have beclouded the issue with exaggerated or contradictory statements. Endocrine preparations were injected into adolescent buttocks long before there was any attempt to study the normal anatomic and physiologic deviations of the onset of puberty and the varying characteristics of adolescence. It is a platitude to say that the United States is a racial melting pot, but in no phase of medicine is this statement of greater scientific significance. Certain races mature early. We expect an Italian or a Jewish girl to establish her menarche earlier than a girl of Scandinavian origin. But with the intermarrying of these innumerable races how can we know the limits of normal deviation in their offspring except in grossly abnormal situations? What is true of our lack of knowledge of normal deviations in maturity onset is also true of normal deviations in growth and other phenomena. I will say a few words about the growth abnormalities of puberty. It is not often that one has an identical twin as a control. Marcella and Marie were 13½ years old when I first saw them. Marcella, with a glioma of the optic chiasm, was 36 pounds (16 Kg.) less heavy and 11 inches (28 cm.) shorter than her identical twin, Marie. She had no evidence of secondary sex development. She showed many characteristics of hypothyroidism. Marie, the normal identical twin, had established her menarche and manifested the expected secondary sex characteristics. There are varying causes of precocious puberty. The following cases, which have been under my care for many years, illustrate three different types: Viola began to menstruate at 2 years. When she was first seen by me at 4 years she was in reality adolescent, with all the secondary sex characteristics of a girl of 14 years. Her condition is evidently due to hyperplasia of the basophilic cells of the anterior pituitary. She is now at nearly 15 years a dwarfed adult only 51⅝ (130 cm.) inches tall, with a pronounced disproportionate shortness of the lower extremities. Irma-Fred is a pseudohermaphrodite, a condition evidently caused by hyperplasia of adrenal cortical tissue. Besides the scrambling of his secondary sex characteristics he is a dwarfed adolescent only 55¾ inches (140 cm.) tall at 19 years. He was born with evidences of precocious puberty and secondary sex characteristics. Johanna illustrates a third type of precocious puberty—virilism. At 5 years she began to mature, but after a masculine fashion. This condition is also due to hyperplasia of adrenal cortical tissue.

DR. E. PERRY MCCULLAGH, Cleveland: In commenting on adioposogenital dystrophies I wish to emphasize the importance of accurate diagnosis. We should no longer speak loosely of "pituitary cases" or consider all obesity in adolescence as Fröhlich's syndrome. In such cases the possibility of suprasellar cyst should be remembered and this possibility eliminated by roentgenograms and perimetric fields if indicated. In the fat child who is taller than normal a diagnosis of Fröhlich's syndrome should be considered doubtful, as the increased skeletal size argues strongly against hypopituitarism. Thyroid feeding of such children may cause abnormal increases in skeletal growth. Hypothyroidism is frequently assumed on the basis of obesity plus perhaps a coexisting hypometabolism. In both instances the assumption is usually unsound. Hypothyroidism may be concomitant in some cases but should be diagnosed on the basis of such criteria as those which Dr. Shelton has so accurately outlined for us. Assays are of limited diagnostic value. If the diagnosis is doubtful for children during adolescence the finding of normal adult levels of androgens or estrogens in the urine may deter us from unnecessary treatment. Thyroid is of limited value in treating obesity. It is well to remember that the basal metabolic rate is not likely to be raised more than 10 or 15 per cent by the doses of thyroid which can be used, and, accordingly, the change in the caloric requirement is likely not to be greater than 150 or 200 calories a day. In my practice, I commonly use a diet based on the basal caloric requirement for the ideal weight, adding 10 per cent. I have used pituitary metabolic hormone in a few cases, but it

has not been of value. The metabolic rate is raised by one injection for only a few hours. Injections twice daily in amounts available to the average person have not led to loss of weight. If true hypogonadism exists, chorionic gonadotropins are useful. If these fail, testosterone propionate in doses of 10 to 25 mg. three times weekly may be tried, bearing in mind the possible production of oligospermia, gynecomastia and perhaps in some cases an increased rate of epiphysial closure if the doses are high and the therapy prolonged for many months. I should like to ask Dr. Thompson regarding the use of chorionic gonadotropins in the treatment of cryptorchism. An anterior pituitary-like hormone has been chosen because it stimulates the interstitial elements of the testes, thereby producing androgenic effects. Is it possible that the high quantities of androgens produced within the body by this means may in themselves reduce spermatogenesis, as occurs with large doses of androgens injected?

DR. HENRY H. TURNER, Oklahoma City: Dr. Novak seems to believe that the obesity of childhood will adjust itself with the onset of puberty. Though this occurs in some instances, it has been my observation that more often it does not. In fact, many of these patients gain more rapidly during this period, with resulting complexes and disturbed behavior patterns. Clinical experience forces me to the conclusion that we should become more awakened to the significance of childhood obesity and correct it as early as possible. I should like Dr. Kunstadter's opinion on this. Also I wish Dr. Thompson would discuss further the influence of male sex hormone on osseous growth. It has been reported recently that the administration of testosterone propionate stimulates somatic growth in the anterior pituitary dwarf. In prepuberal castrates there is a delay in epiphysial closure and a tendency to increased stature. This seems rather paradoxical. Here we apparently have a hormone the lack of which results in the same or a similar effect on the osseous system as is produced by its administration.

DR. E. KOST SHELTON, Los Angeles: What did I mean about patients becoming tolerant to thyroid, or, in other words, insensitive to it? I meant that people who are truly hypothyroid are sensitive to thyroid administration, especially in the early weeks of treatment, while normal persons have some way of metabolizing thyroid and frequently take large doses without objective untoward effect. It has been shown recently by Farquarson that the normal thyroid rests during the administration of desiccated thyroid and that at the end of a certain period the basal metabolic rate will fall lower than it was originally. What is the explanation for the delay in presentation for treatment of hypothyroid children? One of them, the classic cretin I showed, was in a California institution without treatment for a number of years. It was just lost, as so many individuals are lost in large institutions. The other patient came from a rather poor, although intelligent, family. The child was not classically hypothyroid and therefore was not recognized by physicians as such. This is the danger in borderline hypothyroid patients. Too many physicians look for all the classic signs, and when these are not present they fail to recognize the condition. There is another side to this picture. Unfortunately many children suffering from mongolism, birth injury and other nonthyroid disorders are treated as thyroid patients either through ignorance or for monetary gain.

DR. ROGER L. J. KENNEDY, Rochester, Minn.: Dr. McCullagh has proposed two questions. The first has to do with the roentgen therapy of mild instances of exophthalmic goiter or instances of recurrence of exophthalmic goiter. I do not use roentgen therapy. Some workers do use it. I rely on the use of iodine and, when the indication seems apparent, subsequent operation is carried out. In one youngster two subsequent operations were carried out in order to get control of the disease. The other condition there was 1 of the cases of frank myxedema, which has been easily controlled by thyroid. The other question he offered had to do with the question of treatment of persistent or recurrent exophthalmos. Patients with exophthalmos that persists after operation and after subsidence most of the time have symptoms of the disease. Another question offered was "Is it not true that many adolescent girls develop mild hyperthyroidism, with or without exophthalmos, and recover without therapy? If so, how can you tell the cases in which surgery is imperative from those in which it is contraindicated?" One of my main theses has been that we have not recognized instances of hyperthyroidism other than those that occurred in cases of exophthalmic goiter. Furthermore, the use of the term "hyperthyroidism" in children is misleading. If they have hyperactivity it is due to exophthalmic goiter, but we can recognize as clinical evidence overactivity of the gland, such as one sees in older patients. I think that answers both parts of that question. The last question is "Do you imply that all children with so-called exophthalmic goiter have actual exophthalmos as determined by measurement by exophthalmometer?" I can state that exophthalmos sufficient to be measured by the instrument occurred in about 90 per cent of the cases. In about 10 per cent it was very slight and in a few instances not evident. Other symptoms complete the picture, and identification of the type of pathologic change in the thyroid gland established the diagnosis of exophthalmic goiter.

DR. A. WILMOT JACOBSEN, Buffalo: I have a question: "Is there any evidence that Lorain and Brissaud dwarfism are due to endocrine dysfunction or hypofunction?" This question refers to the delicately built, normally proportioned dwarfs who are made sexually infantile, and this condition, theoretically, should be due to primary pituitary deficiency, and therefore I feel that they should be given a trial on appropriate endocrine therapy. The next one is "Is there any hormone or hormones for anti growth effect for those who grow too tall when height alone is excessive?" Several things have been suggested. One is irradiation of the pituitary to try to decrease the output of growth hormone, but the chance of damage to other important hormones of the pituitary is too great for such a course to be advocated. Another theoretical suggestion has been to try to close the epiphyses by giving an excess of the sex hormone and, as we have heard today, that does not seem to be a highly satisfactory way to treat this condition. It is a question whether it really does just that. I believe that at present we have no adequate way to treat these excessively tall children.

DR. EMIL NOVAK, Baltimore: I have quite a sheaf of questions, but I think I can group them fairly satisfactorily. First, with reference to Dr. Turner's comment on prepuberal obesity, the traditional distinction between exogenous and endogenous factors is still a useful one. Many children, like many adults, are fat because they overeat and do not exercise sufficiently. Correction of these faults brings about disappearance of the excess weight. On the other hand, I am convinced that the endocrine "reshuffle" of puberty exercises a beneficent effect in many of the more moderate degrees of endocrinopathic prepuberal obesity, while in other cases the adiposity is progressive and may even be accentuated by puberty. In the common so-called pituitary type, menstruation and ovulation may both be affected, but they are frequently entirely normal in that large group of cases in which the disturbance is believed to be in the hypothalamus rather than in any of the endocrine glands. Many of the most extreme cases fall into this group, as exemplified by many of the fat women of the circus. Three of the questions submitted to me deal with the indications for gynecologic consultation in the adolescent girl. First of all it should be emphasized that the least important part of gynecologic consultation in patients of this age group is apt to be the examination of the pelvic organs. More important is the study of the general and endocrine status and the mode of life as to such things as exercise and diet. It is some abnormality of menstruation which most frequently brings such patients to the gynecologist, and the intelligent study of these disorders compels him to broaden his horizon far beyond the brim of the pelvis. In a large proportion of cases reassurance and education of the child and her parents is far more necessary and effective than is endocrine therapy. This applies particularly to the "shots" to which so many practitioners resort for the irregularities so common at this age. Many of the latter, such as periods of amenorrhea or menstrual arrhythmia in the first few years of menstrual life, often adjust themselves spontaneously. In reply to another question, I may again emphasize that endocrine therapy, except for the cautious use of thyroid in many cases, is rarely called for in the management of primary amenorrhea in girls under 17 unless a very definite endocrinopathy is demonstrable. Another query has to deal with a possible causal

influence of amenorrhea in schizophrenia. For this there is, so far as I know, not the slightest evidence. On the other hand, it is a well known fact that amenorrhea is a frequent finding in the various forms of insanity.

DR. RALPH H. KUNSTADTER, Chicago: The question is raised "When to treat adiposogenital dystrophies, in view of the fact that many of them recover spontaneously with the advent of puberty?" I think this depends principally on two factors. These are the physical condition of the child and the psychologic reaction. A child who is tremendously obese, knock kneed and flat footed and has a typically feminine appearance needs medical treatment. Nobody can predict when puberty is going to take place. It is supposed to occur in the male somewhere between 12 and 16 years of age. When the child is physically handicapped because of his appearance, I don't think we are justified in waiting for spontaneous improvement with puberty. I agree with Dr. Turner that many of these obese children do not improve spontaneously. As I showed in the case of the two brothers, obesity was tremendous even after puberty and adolescence occurred. If the child has a physical appearance that definitely makes him different from the normal type of child at the age when puberty is supposed to take place, he should be treated. The psychologic factor is particularly important in children who are starting in high school and are physically handicapped because of their appearance. They are frequently self conscious, particularly when they go into the swimming pools, into the gymnasiums and to social gatherings. At the present time there is criticism with regard to diagnosis of adiposogenital dystrophy from those who feel that many of these patients are simply children who overeat and will outgrow their condition if they have proper psychologic treatment and nothing more. The question of appetite is an involved subject. Meyerson has shown that overeating may be a question of some psychologic disturbance, an outlet for some emotion, particularly in women and children. They eat constantly because they haven't anything else to do or because they are disturbed or frustrated. There are also organic factors to be considered, particularly since we know that the hypothalamus is associated with appetite. Adiposogenital dystrophy may be produced by definite lesions in the hypothalamus. We now know, for example, that the pituitary itself may liberate increased or decreased amounts of sex hormone, depending on whether there is stimulation of the posterior or anterior portion of the hypothalamus. There is reason to believe that the hypothalamus is the controlling mechanism of the endocrine system, and not the pituitary.

DR. WILLARD O. THOMPSON, Chicago: Dr. McCullagh asked whether there was any danger of cryptorchism lasting until the age of 10 years or even until the age of puberty. What is the harm of waiting until then? We pointed out that the normal environment of the testis is the scrotum, and it cannot function normally except in the environment of the scrotum. The testis normally moves into the scrotum during the ninth month of fetal life. We previously thought treatment should begin at the age of about 3 years. In many instances in which the testis had descended with chorionic gonadotropin or as a result of surgical procedure carried out after unsuccessful treatment with chorionic gonadotropin we have observed that the testis, even some time after it has come down, is smaller than the testis which was originally in the scrotum and is sometimes flabby as well. In other words, in spite of being brought down it is somewhat abnormal. We are therefore beginning to wonder whether the reason for this abnormality is the fact that we did not carry out the treatment early enough, and we are beginning to revise our age for treatment downward. "Is there any danger of malignancy, or is the danger of malignancy reduced by treatment?" We do not think so. If the testis is going to develop a malignant tumor, we think it will do so whether it is in the abdomen or in the scrotum. Furthermore, we should like to point out that the danger of undescended testes becoming malignant has been greatly exaggerated. We have not seen a single instance of malignancy in all the patients with cryptorchism whom we have followed. Dr. Turner asked me to say more about the influence of the male sex hormone on growth. We have observed that growth of the skeleton in young boys and in certain dwarfs may be stimulated either by administering chorionic gonadotropin, which stimulates the production of male sex hormones, or by administering the male sex hormone itself. "If this is so," Dr. Turner says, "why do eunuchoid individuals grow so well? Why are they sometimes even taller than the average?" That is a very good question, which nobody can answer at present. With glandular therapy we can determine at an early age whether the testis is retained by mechanical factors or whether it is not, and if it is retained by mechanical factors we can, as a result of the growth produced by glandular therapy, carry out operative procedures just as easy in a very young child as we can in the same patient without glandular therapy at the age of 12 or 14 years. It is very important that there should be no interval between the time at which glandular therapy is stopped and that at which the surgical procedure is carried out, because, if there is, some regression in size may occur which makes the operative procedures more difficult.

A PLEA FOR UNITY IN HEALTH ADMINISTRATION AT THE STATE LEVEL

JOSEPH W. MOUNTIN, M.D.
Assistant Surgeon General, Domestic Quarantine Division, United States Public Health Service
WASHINGTON, D. C.

If instead of writing a paper designed for a scientific group I were giving a sermon, I could think of no better text than item 1 from the platform of the American Medical Association as published in a number of issues of THE JOURNAL last year:

> The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.

Again, if this were a sermon, in adapting the text to my purposes I should need only to substitute the word state for federal. For this resolution seems to me an excellent one to apply to the agencies conducting affairs of public health within the states even as it was to apply within the structure of the federal government.

One may be inclined to qualify my use of "was" in respect to federal reorganization, but I think it is the correct tense for the situation if used without the implication that perfection has been reached. Unity of organization in the promotion of health gradually has been coming to pass at the federal level, though the form is perhaps not precisely that which the Association has been urging for many years. The establishment of the Federal Security Agency two years back brought a number of units which carry on some health activities into one general fold. At the present writing it includes these agencies: U. S. Public Health Service, Social Security Board, Civilian Conservation Corps, Food and Drug Administration, Office of Education, Freedmen's and St. Elizabeth's hospitals, American Printing House for the Blind (Louisville, Ky.), Howard University, Columbia Institution for the Deaf and the National Youth Administration.

The United States Public Health Service is concerned solely with matters pertaining to human health. It is charged with direct administrative responsibility for certain duties. To other activities it contributes technical direction. When occasion demands, as occasion regularly does, the Service acts in an advisory capacity to federal agencies which must maintain a program of health as part of their own operations. Two medical officers, for example, are assigned to the

From the Division of Domestic Quarantine.
Read before the Section on Preventive and Industrial Medicine and Public Health at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 4, 1941.

National Youth Administration to guide the development of certain medical services which are an integral part of the responsibility of this agency to its beneficiaries.

Though the Federal Security Agency may seem rather loosely knit from a medical point of view, the intent of item 1 of the platform of the American Medical Association is being carried out in an evolutionary way.

My plea for the application of this principle to state agencies does not imply too close an analogy between the structure for public health within the federal and within the state governments. The state agencies differ from those at the federal level chiefly in that they carry direct responsibility for the administration of service programs. It is precisely in this departure that one recognizes the even greater need for unity of organization. For it is particularly among operating agencies of service that aims and duties are apt to overlap and underlap and sometimes collide, and a likely corollary to the confusion is great waste of effort, energy and of course money. The zealot for good public health administration would find the health structure of the states a rich field in which to exercise his ardor.

The United States Public Health Service has on hand some recent, exact data on this confusion of effort, which were gathered for a revision of Public Health Bulletin 184,[1] the descendant of the survey of state health organizations published by the American Medical Association in 1915.[2] The current revision will be a new version. Not only have the previous data, as is the way of all data, grown old and inadequate, but the public health scene has undergone a great transformation. Health departments today are participating in programs which had not been developed as recently as ten years ago. Either the technics were inadequate or the activities were considered outside the bounds of public health administration.

Furthermore, the emphasis was shifted somewhat in planning the forthcoming revision. The other bulletins amounted to a study of the divisions of state health departments, and the approach in gathering the data might be summed up by the question "What does this division do?" Such a study gives a picture of a division at work. In the latest survey the approach could be characterized by the questions "What branches of this state government are responsible for the work in (for instance) tuberculosis?" and "What is the total program?" The answers add up to the current story for each field of activity in terms of which agencies are operating there and what they are doing. On that emphasis hangs this tale of duplication and lost motion.

The survey schedule included all the old line public health fields, such as vital statistics; acute communicable disease control; maternal and child health; control of tuberculosis, including hospitalization; sanitation of food, milk and water supplies, and sewage disposal.

Other activities in the schedule included some not commonly undertaken in public health programs. Social thought in the last ten years has been busily coordinating considerations of personal health, economic security and happiness. The conclusions reached are by no means hard and fast. But the present survey has been conditioned far more than the others were by considerations of what in the light of present knowledge should go into the efforts to promote the public's health.

A program such as that for the control of the venereal diseases represents a combination of the old and the new aims. Syphilis is a communicable disease, but it is a clinical entity as well, and the programs recognize both these facts. Society is to be protected. The individual is to receive the diagnosis and treatment that will rid him of his disease.

The schedule as set up does not define public health as a program of any particular content. Care was taken to avoid having it do just that. Also, the purpose of an activity was not decided according to where the administrative responsibility had been placed. The inclusion or exclusion of an item was decided by whether the item was usually defended before appropriating bodies on the basis of its influence on human health and well-being.

Each function was traced in all its ramifications through the entire structure of state government, irrespective of where administrative responsibility had been placed. The infant hygiene program, for example, would usually be found in the health department, but the supervision of institutions for the care of children, a vital part of any program of infant hygiene, might be vested in the department of welfare.

As far as possible, under each major category of service were listed the several participating state agencies. Participation was accounted for under five headings: regulation, promotion and education, supervision and advice, financial aid to local units and operation of direct service programs.

This list is a generalization for the nation as a whole. A state may use one or any combination of the approaches in it, in a complete health program or a partial one and through an astonishing multiplicity of agencies. In other words, no uniform pattern as to organization or program exists throughout this country.

In one state the activities relating to health are in the hands of no less than eighteen separate agencies. The smallest number of agencies involved in any one state is six. The median number of departments, boards and commissions is eleven per state.

Haphazard is the word for the situation. An artist given to surrealism would be best equipped to present a picture of the haphazardness in all its glowing complexity, but both talent and time restrict me to a word picture of a few activities and the agencies that father them.

In general, the states vary most in their ideas as to the portion of responsibility to be borne by the state agency and the portion to be delegated to local jurisdictions. One state may cleave entirely to advisory, supervisory and promotional activities. Another may be active in programs of direct service, such as those which involve treatment for the venereal diseases or roentgenograms of the chest. Or a state may hold some programs to the advisory function and consider others of value only if they carry direct services. One state may grant financial aid for activities far different from the ones selected for this type of assistance by its neighbor.

The administration of tuberculosis control programs offers an interesting case study of the variety that is the spice of life under some circumstances but a drawback to life when practiced by the agencies that should be working with all possible precision to promote health.

1. Ferrell, J. A.; Smillie, W. G.; Covington, P. W., and Mead, Pauline A.: Health Departments of States and Provinces of the United States and Canada, Public Health Bulletin 184, revised, United States Treasury Department, Public Health Service, 1932.

2. Chapin, C. V.: A Report of State Public Health Work, Based on a Survey of State Boards of Health, Chicago, American Medical Association, 1915.

This disease has so long been recognized as one of the outstanding public health problems of the country that measures for its control are usually assumed to be centered in the health department. This is true, but only within limits. There are still a variety of agencies involved in the handling of this problem. A nationwide picture of the work of tuberculosis control as carried on by official agencies at the state level includes the contributions of some dozen state organizations. The classification is interesting: health department; department of welfare or social security; tuberculosis board or commission; board of control; department of institutions, otherwise known as eleemosynary board, board of affairs or board of charities and correction; department of education; hotel commission; state hospital, of which there may be several, each under its own board of trustees; independent state laboratory; department of public assistance; board of commissioners; state university; state treasurer, and state legislature.

Within individual states the number of official departments, boards or commissions concerned with tuberculosis ranges from one to five. Without exception the health department is one of these agencies, but in less than one fourth of the jurisdictions is it the sole official body involved. Two agencies participate in the tuberculosis programs of about half the states. Programs under triple agencies are nearly as numerous as those under single state departments. In three states four separate official bodies are responsible for some portion of the aggregate state service, while in another as many as five agencies participate.

The scattered sort of program arrived at under the circumstances mentioned is not hard to imagine. Again and again it was found that the several agencies conducting activities against tuberculosis within a state would go their separate ways without regard to one another, apparently without any notion of working out a balanced program from their individual schemes.

There is no uniformity in the manner in which responsibility is divided among the organizations concerned. In one state, activities of the several agencies might be rather evenly distributed from the standpoint of emphasis. In the next, sanatoriums operated by one agency dominate the picture, while the contributions of field agencies are minor in character and unrelated to the institutional program.

Such variations run through all the activities connected with the control of tuberculosis—the supervisory and advisory work, the determination of the extent and purpose of the financial aid given and the programs of direct services.

A miscellany of agencies have acquired responsibility for the various aspects of the programs of food and drug control. One reason is the lack of agreement as to what the work covers. It is known to range from slaughter houses to beauty parlors, but one cannot find a definition certified either by precept or by practice. The methods are varied too, because control is taken to have different meanings. It may be something as precise as licensing or as superficial as a casual check of employees' health.

The maximum number of agencies involved in any one state is four, and seven states have that number. It is the division of labor among the agencies that makes for the greatest confusion. The split seems to be a matter of heads or tails. In some states it is made according to products and the places where they are dispensed, with one agency responsible for food, another for drugs and perhaps a third for the supervision of hotels and restaurants. In other states the work may be split according to the basic functions of the agencies, with one held responsible for the sanitation of premises and another for other aspects of food and drug control. A third type of split comes about when the organization legally responsible does not do the work, and another undertakes some of the duties.

The crippled children's programs I may also cite for lack of uniformity. There are at least six different types of agencies having major responsibility for them. The health department is the official agency in about half the states and the department of welfare in about a fourth. A complicating factor in ten states is a second agency, which looks after the hospitalization of crippled children at state expense but operates independently of the major agency charged with the official plan.

The same diffusion of responsibility and variation in programs runs throughout the whole scheme of state health administration, but space will not permit the detailing of each program. The urgency of the present situation is such that attention should be drawn to one more field—industrial hygiene. Programs of industrial hygiene were expanding in what seems now to have been an idyllic era of peace. They are due to expand still more as industry grows in the preparations for national defense. The work which has come to be well known as industrial hygiene could not begin to protect the workers in 1917 as it can protect them today.

Even now six states have no formal program and no activities. Five have the activities without a definite program. Five different agencies are involved among the forty-eight states—the department of health, the department of labor, an industrial board or commission, the department of mines and minerals and the state university—though the last agency functions in only two states. There is no discernible pattern to their teamwork. It frequently happens that the labor department holds legal responsibility but limits its concern to inspection. The health department may step into the picture by conducting studies and giving advisory services, but its organization may not be geared to definite remedial measures.

I hope that the selections I have made from the voluminous data at hand will point up even though they do not clarify the design for health activities at the state level. In general this haphazard design has been accepted for a long time as though it were laid out by some inscrutable public health providence. Just why I don't know. Certainly the proverbial visitor from Mars who observed men solicitously greeting one another morning, noon and night with "How are you?" might assume the quest for health to be among the best organized of all earthly pursuits.

Perhaps some one would like to ask, "Why should it be? Health is acquired by each person for himself in a variety of ways. A man gets it from the sun, from sleep, from exercise and from eating his roughage. Why all the bother about a central agency to produce what has been arriving in mysterious ways over the centuries?"

A person also picks up education as he goes along, for one cannot divorce learning from the experiences held out by life. A man's economic circumstances improve, and he buys a car and learns about cars from it. Architects build finer houses, and the owners acquire finer tastes for the esthetics of home life. Nevertheless,

a central department of education is maintained without cavil to organize the learning of the ages and to distribute it.

For the same reasons one can argue the organization of the forces of health to supplement the forces of chance in bringing to the greatest number of people this greatest of blessings.

ABSTRACT OF DISCUSSION

DR. R. H. MARKWITH, Columbus, Ohio: I join with Dr. Mountin in a plea for unity in health administration at the state level. During recent years many new and complex health problems have been created which have caused official agencies to overlap their activities. This condition exists in the administration of health in practically every state. The necessity for unity in health administration at the state level is appreciated by every one engaged in administering public health programs. In each state there are many official and nonofficial agencies administering medical and health functions that are duplicating and overlapping their services. The field of public health is of such magnitude that an opportunity is provided for unlimited activity for each of the official and nonofficial agencies. The problem is to provide a coordination so that each agency can best perform the functions for which it is especially equipped and prepared. It often requires many years to bring about changes in existing laws as well as established policies of various organizations. Many new medical and health problems will be presented in the national defense program. These problems should be considered jointly by official and nonofficial agencies so that the agency or agencies best equipped or prepared for a special function may assume the responsibility of leadership and guidance. Nonofficial agencies have long been pioneers in the field of public health. They have been able to secure funds and community leadership for programs that would have been long delayed awaiting official authority and appropriations. Many medical and health problems will be presented during the months ahead. That will require unity and team work by the departments of state government and all agencies having programs and functions that are related to the public health. A unity in health administration can be accomplished by a spirit of cooperation and coordination.

DR. HENRY A. HOLLE, Chicago: It has been one of my duties to go out and interview states under Dr. Mountin's direction and collect data from the eighteen, more or less, branches of state governments and ferret out the duties of a health nature which have been assigned to them or been heaped on them by legislative chance. The health job really should be considered under one category or department of state government. I find in discussing with the several departments of state governments doing health work that some of them are extremely interested in what they are doing; some, on the other hand, have had it dumped on their laps by the convenience of the legislature or through the unwillingness of other departments to do the work. This is an unfortunate condition, especially in view of the fact that many state health departments would like very much to be doing health jobs which are being done by other departments of state governments. Now, what effect does this have on the private physician? It forces the private physician to seek aid for his patient, if such aid is available, from a large number of offices or departments in the state government. The same situation obtains locally. If his patient has pneumonia he will get serum, perhaps from the health department; if his patient requires hospitalization he will have to go to the welfare department, and if he requires sulfapyridine he will have to go to the local druggists or to a local charitable organization which has pooled some money to pay for that. There arises a question as to whether state departments of health will be able to maintain their dignity as departments of state government unless they are given or will assume greater responsibility with the whole health problem. I believe that the profession of medicine has about decided—I hope it has—that health and all activities which might be labeled as health should be in one department of state government and under competent medical administrative direction.

DR. JOHN A. FERRELL, New York: Dr. Mountin has discussed a problem of great importance and perplexity. He merely pointed out the lack of uniformity of procedures in the states and the resulting confusion. I wish he might have suggested the remedy. The suggestion that a state health department assume functions which have been allocated by the legislature to other branches of government is asking much if not the impossible. Dr. Mountin's discussion did not make clear whether he thought that the correction in the distribution of health functions should begin in the states and work toward Washington or start at Washington and move toward the periphery. Perhaps some of the state officials would welcome help from Washington in correcting their organization problems and in turn would cooperate in a plan designed to unify the federal health and medical services. Seriously, states have grown up under different conditions, leadership and tradition. Some of the state functions in the field of public health are provided for in the constitution of the state. The plan of organization differs from state to state. It would be extremely difficult to create a sentiment for uniform state organization. What can be done should have careful consideration. It may be questioned whether the formula is the vital factor. In a particular state there may be a poor organization plan, but, if there exists competent leadership, excellent results may be had. Again the most logical formula with poor leadership may yield poor results. In many of the fields of activity it is being found that two or more state services have common interests. The department of health and the department of education have common interests. If the departmental leaders in such states are competent they will discuss plans for the coordination and integration of their activities. If such departments should present to the legislature the fact that the present organization and allocation of functions are poor, an improvement might be arranged for. There is excellent cooperation of this kind in North Carolina and in Tennessee. A coordinator for the two departments is jointly employed. He attempts to formulate a sound program and allocate to each of the departments the share of the common or overlapping responsibility it should assume. In the field of nutrition, coordination of effort between more than two departments is desirable. The public needs the health department, the medical profession and services in the fields of welfare, education, agriculture and agricultural extension. There are movements under way now in some of the states directed to bringing the forces together for the purpose of formulating a program at the state level and allocating responsibilities to the respective agencies. Developments of this kind may contribute to the solution of problems Dr. Mountin presents.

DR. J. N. BAKER, Montgomery, Ala.: The author has stressed the urgent need in health work for unity at the state level. Dr. Ferrell in his discussion gently insinuated that a little more unity at the federal level might not react disastrously. We need greater unity and a finer sort of cooperation at all levels, both official and voluntary. At this critical moment there are scores of voluntary agencies eager to do and hungry for the leadership which the health and medical professions should furnish. This constitutes not only a real challenge to professional health workers but also an exceptional opportunity for wholesale self integration of the vertical administrative type. Having put our own house in order, we should then find ourselves in a strategic position to render a real service to the many kindred agencies all about us, be they official or voluntary. In my own state of Alabama, both the armed forces of the nation and industry are engaging in large scale activities at many points. To each of these have been extended all the facilities available within the health department. This has proved particularly true of the services which we have been able to render through our engineering staff in matters relating to water supplies, sewage disposal, malaria control and environmental sanitation. This is the golden opportunity for official health agencies to prove their worth and to win recognition as an indispensable arm of government, a recognition which often times has been grudgingly given.

DR. JOSEPH W. MOUNTIN, Washington, D. C.: Dr. Ferrell alleges that there is lack of progress toward integration of health services at the federal level that might serve as an example for the states. In the opening paragraphs of my paper

I outlined briefly the Federal Security Agency and the steps toward integration that have been accomplished since that agency was established. Then he asked why I did not suggest an over-all scheme of organization for the states. The purpose of my paper is to call attention to the wide dispersion of responsibility for health services that now obtains in the structure of state governments. Another and very good reason for not suggesting a standard plan is that I do not believe state health organizations should conform to a single pattern. Above all, I would not advise that any federal scheme of organization be adopted by all the states or any group of states. Responsibilities of states for protection of human health differ from those of the federal government; likewise, each state has peculiar problems that require individual treatment. I still contend, however, that certain basic principles of administration should be incorporated into all state schemes of health organizations.

ACUTE ANTERIOR POLIOMYELITIS

STUDY OF AN OUTBREAK IN WEST SUBURBAN COOK COUNTY, ILL.: PRELIMINARY REPORT

EDWARD A. PISZCZEK, M.D., M.P.H.
HOWARD J. SHAUGHNESSY, PH.D.
JOSEPH ZICHIS, PH.D.
AND
SIDNEY O. LEVINSON, M.D.
CHICAGO

Fifteen cases of acute anterior poliomyelitis occurred in the western suburban areas of Cook County during the period from June 4 to July 11, 1941. Five cases occurred in Western Springs (population 4,856), 3 in La Grange (population 10,479), 3 in La Grange Park (population 3,406), 2 in Park Ridge (population 12,063) and 1 each in Oak Park (population 66,015) and Berwyn (population 48,451). Table 1 reveals the age, sex, color, geographic location, onset date of symptoms and disease course. Nine patients developed paralysis, in 2 of whom the disease was fatal.

An examination of the accompanying map reveals that 11 of the 15 cases occurred in La Grange, La Grange Park and Western Springs, which are adjacent to one another. No further cases were reported from these three towns after July 11.

An epidemiologic survey was conducted in the entire area affected by this outbreak, but the laboratory phase of the study was restricted essentially to the five Western Springs cases, their contacts and controls. The National Foundation for Infantile Paralysis, Inc., promptly supplied funds to support the laboratory investigation. The Illinois Committee on Infantile Paralysis,[1] which was immediately formed, met frequently to discuss and guide the progress of this investigation and to examine disease incidence throughout the state for outstanding features which might lend themselves for further study.

Aided by an appropriation from the National Foundation for Infantile Paralysis, Inc.

From the Cook County Public Health Unit (Dr. Edward A. Piszczek, director), the Division of Laboratories of the Illinois Department of Public Health (Dr. Roland R. Cross, director) and the Samuel Deutsch Serum Center of the Michael Reese Hospital, Chicago.

1. Committee members: Dr. Edward A. Piszczek, chairman, director of the Cook County Public Health Unit; Dr. Robert Black, professor of pediatrics, Loyola University School of Medicine; Dr. Herman N. Bundesen, president, Chicago Board of Health; Dr. Roland R. Cross, director, Illinois Department of Public Health; Dr. Irving Cutter, former dean, Northwestern University Medical School; Dr. Morris Fishbein, Editor, THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION; Mr. Arthur Gorman, engineer of Water Purification Division, City of Chicago; Dr. Sidney O. Levinson, director, Samuel Deutsch Serum Center of Michael Reese Hospital; Dr. Howard J. Shaughnessy, chief, Division of Laboratories, Illinois Department of Public Health, and Dr. Winston H. Tucker, Health Commissioner, Evanston, Ill.

The first 4 cases appeared during the last ten day period of school, June 4 to June 14. The first 2 cases occurred in a public school; the first case had its onset on June 4 and the second case on June 10. The third and fourth cases occurred at two day intervals following the second case and were reported from a parochial school which was directly across the street from the public school. The water supply, sewage disposal system, school grocery store and school playgrounds were common to the two schools.

Contacts A, B and C attended the same parochial school and also a school picnic on June 6 with patients 3 and 4. There was direct or indirect personal contact from these first 4 patients, particularly through contacts A, B and C, with 9 of the succeeding patients, although none of the latter attended either of these two schools. The available information of contact between the patients which appears to be pertinent to this study is shown in the accompanying chart.

Contact A lived in Western Springs, although he attended school in La Grange. With his younger brother and elder sister contact A operated a lemonade stand in the yard of their home on June 23, 24, 25 and 26 inclusive. This yard was a gathering place for many children of the neighborhood, who played together and some of whom drank lemonade. On the evening of June 26 the girl (patient 7) who operated the lemonade stand with her brothers became ill with poliomyelitis. The parents of those children who were contacts of this girl were advised to watch for early symptoms of this disease. On July 6 one of the intimate contacts (patient 12) to the lemonade stand became ill with bulbar poliomyelitis. Four days later, July 10, one of his playmates (patient 14) came down with a severe paralytic attack of the disease. This boy gave no history of drinking lemonade or playing at the lemonade stand but had direct contact with approximately three of the boys who were regular lemonade customers and he was also in direct contact with patient 12 during a July 4 celebration in the village. Patient 14 was also an indirect contact of patient 5. The latter had left the town on June 20, on which day he became ill, and was later diagnosed in Denver as having poliomyelitis. We could elicit no history of any contact, direct or indirect, between this patient and the 4 patients who preceded him.

Contact B was a school contact of patients 3 and 4 and also attended the school picnic on June 6. This boy lived with his mother in La Grange. The father (patient 11) of this child was separated from the mother and lived in Berwyn, 4.9 miles from La Grange. The child visited with his father on June 7, 14, 19, 21 and July 2, during which time they swam, ate and attended the theater together. From June 21 to July 2 the boy had an active smallpox revaccination that confined him to his home. On July 5 the father became ill with an ascending paralytic poliomyelitis, which terminated in respiratory paralysis and death on July 9. Examination of the brain and cord revealed extensive and profound histopathologic changes characteristic of severe poliomyelitis. The son (contact B) left the state and could not be located until the first part of August, at which time a stool specimen was obtained from which the virus of poliomyelitis was subsequently isolated. An additional noteworthy fact is that patient 11 worked in a large administrative office in Chicago and some of his associates lived in Western Springs and Oak Park. The father of patient 10, who contracted poliomyelitis on July 3, was also a worker in this office but it was

not possible to determine the degree of contact between the two men. It is also of interest that patient 10 spent the night of June 21 visiting friends in Western Springs.

Contact C was a school playmate of patient 4 and at no time showed any signs of illness, but his 14

TABLE 1.—*Acute Anterior Poliomyelitis in Western Suburban Cook County, 1941*

By Case Number, Date of First Symptoms, Age, Sex, Color Location and Disease Course

Case No.	Date of First Symptoms	Age	Sex	Color	Location	Disease Course
1	6/ 4/41	6	♀	White	La Grange	Paralysis
2	6/10/41	10	♂	White	La Grange Park	Complete recovery
3	6/12/41	10	♂	White	La Grange Park	Complete recovery
4	6/14/41	13	♂	White	La Grange Park	Paralysis
5	6/20/41	5	♂	White	Western Springs	Paralysis
6	6/26/41	14	♀	White	La Grange	Paralysis
7	6/26/41	12	♀	White	Western Springs	Paralysis
8	7/ 1/41	14	♂	White	Park Ridge	Complete recovery
9	7/ 2/41	9	♂	Negro	La Grange	Complete recovery
10	7/ 3/41	5	♂	White	Oak Park	Paralysis
11	7/ 5/41	35	♂	White	Berwyn	Fatal
12	7/ 6/41	11	♂	White	Western Springs	Complete recovery
13	7/ 7/41	8	♂	White	Park Ridge	Complete recovery
14	7/10/41	11	♂	White	Western Springs	Fatal
15	7/11/41	23	♀	White	Western Springs	Paralysis

year old sister (patient 6) became ill with poliomyelitis on June 26.

Contact D on June 27 drank some of the lemonade remaining after the closure of the stand on June 26. On June 30 this boy had his adenoids removed for the second time. He returned from the hospital the following day and remained indoors until July 4. He later stated that during this period his joints and back ached and at times he felt dizzy. He also said that once he saw double. However, there was no history of fever, headache, stiff neck or stiff back. On July 4 he attended the aforementioned village celebration, at which time he was in contact with patient 12. His 23 year old sister (patient 15) became ill with poliomyelitis on July 11. The stool specimen collected from contact D was subsequently shown to contain the virus of poliomyelitis.

Patients 2, 3 and 4 lived in La Grange Park. Patients 1, 6 and 9 lived in La Grange. Patient 9, a Negro boy,

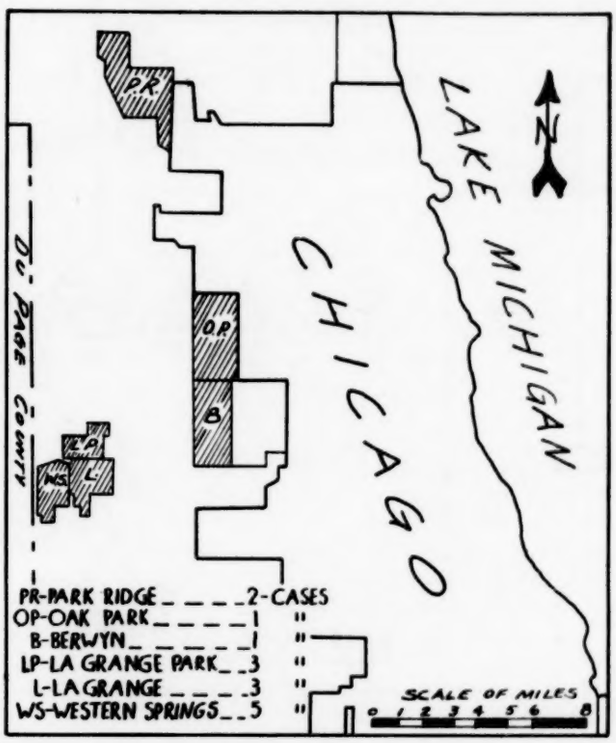
TABLE 2.—*Results of Injection of Stool Specimens*

	Number Collected	Number Injected to Date	Number Positive	Number Remaining for Injection
Cases	5	4	3	1
Contacts (type)				
Family	16	12	1	4
Playmate	9	6	1	3
Lemonade	5	5	1	0
Family—lemonade	6	6	2	0
Playmate—lemonade	8	6	1	2
Casual or indirect	4	3	0	1
Total	48	38	6	10
Controls				
Normal	20	14	0	6
Diarrhea	5	0	0	5

was the son of a mail carrier whose route was in La Grange. There was no other detectable contact between this patient and other patients in this vicinity. Patients 5, 7, 12, 14 and 15 lived in Western Springs. Patients 8 and 13 lived in Park Ridge approximately 12 miles away from the aforementioned areas, and no contact could be traced between the Park Ridge patients and the others.

The epidemiologic survey disclosed three separate sources of drinking water, nine different milk supplies and attendance at ten different schools. Five of the patients swam in four different swimming pools. A trained physical therapist made a complete muscle examination of all the contacts to the patients involved in this study with the thought that there may have been some mild unrecognized cases. No muscle weakness or paralysis was found among these contacts.

When it was ascertained that funds would be available for laboratory study of this outbreak, the prompt collection of stool specimens was started. The laboratory study was restricted to the four contacts A, B, C and D, the 5 Western Springs patients 5, 6, 12, 14 and 15 and family, playmate, lemonade stand (lemonade drinkers only) and indirect or casual contacts of these patients. The number and type of stools collected and the results to date are presented in table 2. For control



Geographic distribution of cases.

25 residents of Western Springs who were of the same age group as the patients and who had no known contact with the patients or their contacts submitted stool specimens for study. Five of the control group had attacks of diarrhea during the time of this outbreak.

METHOD OF COLLECTION, PREPARATION AND INOCULATION OF STOOL SPECIMENS

The stool specimens, weighing about 45 Gm. each, were collected in sterile glass jars and refrigerated in an insulated box until delivered to the laboratory, usually within twelve hours. In the laboratory they were kept at approximately 8 C. for twenty-four hours and then frozen in the freezing compartment of an electric refrigerator or with solid carbon dioxide. They were maintained in the frozen state until prepared for inoculation.

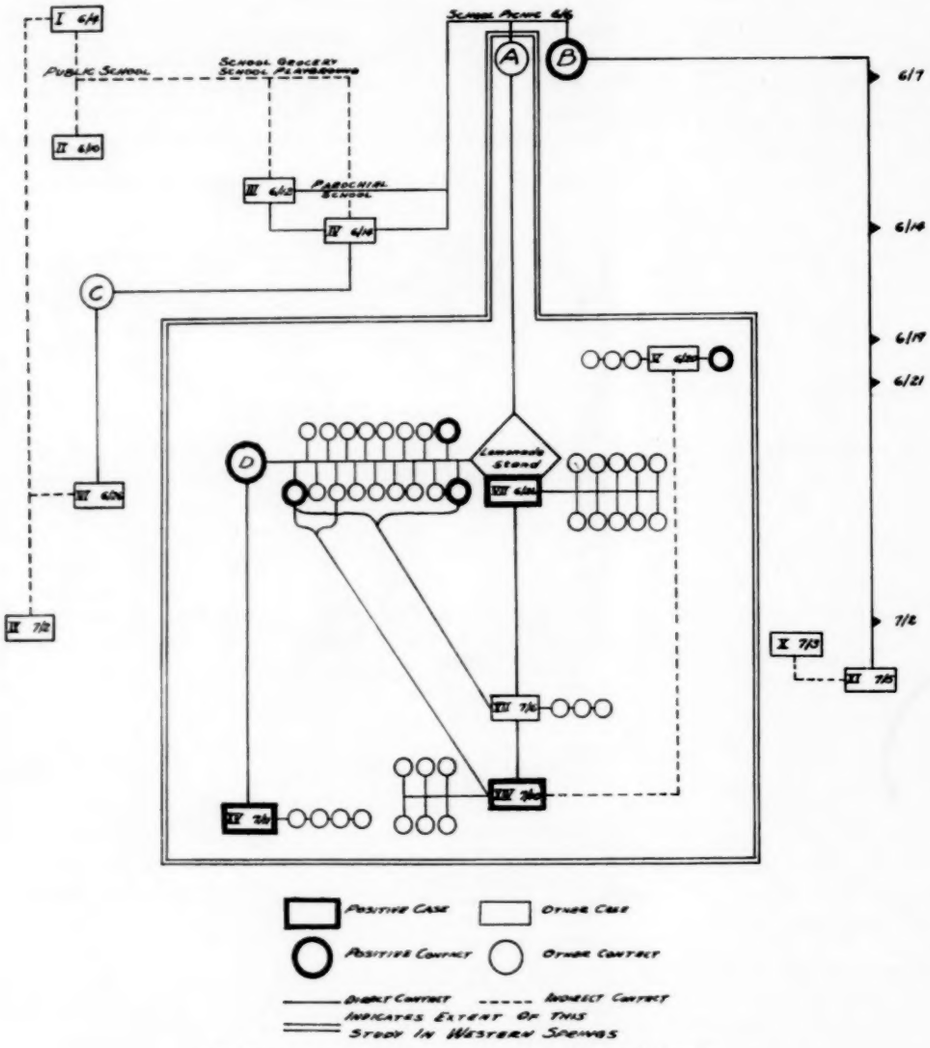
Rhesus monkeys (Macaca mulatta) were inoculated by the combined intranasal and intraperitoneal routes. Untreated feces, diluted with sterile distilled water from 1:2 to 1:20, depending on their consistency (on the

average 1:5), were employed for the intranasal instillation according to the technic of Howe and Bodian.[2] One cc. of this emulsion was instilled into each nostril under light ether anesthesia. After the instillation the nasal mucosae were slightly irritated by rubbing the nares with a pledget of cotton. The intranasal instillations were repeated twice within the succeeding ten days, generally at intervals of three days.

The stools were prepared for intraperitoneal inoculation by a slight modification of the method of Trask, Paul and Vignec.[3] They were diluted to about 1:5 with sterile distilled water. The resulting emulsions were then thoroughly shaken and allowed to settle for one to two hours in the refrigerator. Thirty cc. of the top layer was drawn off and 15 per cent by volume of anesthesia ether added to it. The ether mixtures were shaken thoroughly and refrigerated for about eighteen hours. After another shaking they were centrifuged for ten minutes at 2,000 revolutions per minute. The middle layer of each preparation was then drawn off and used for the intraperitoneal injections. A single dose of 10 cc. was employed and was usually well tolerated. A culture of the inoculum made on plates of blood agar and Endo's medium revealed that most of the streptococci, colon bacilli and other aerobic bacteria had been destroyed by this treatment.

Two monkeys were inoculated with each stool specimen. The animals were observed daily for physical signs of poliomyelitis. Rectal temperatures were taken daily by assistants who wore rubber gloves and washed their hands thoroughly after handling each pair of monkeys inoculated with the same stool specimen.

All the monkeys were killed forty days after inoculation if they did not show signs of poliomyelitis before the end of that period. Complete gross postmortem examinations were made of all animals. Microscopic sections of brain and spinal cord were examined routinely for histopathologic evidence of poliomyelitis. Other organs were also examined microscopically when necessary.



Outbreak of poliomyelitis in western suburban Cook County.

RESULTS OF LABORATORY STUDY

The basic criteria adopted for proof of isolation and identification of the virus of poliomyelitis were as follows: the appearance of clinical signs of the disease, particularly flaccid paralysis, in at least one of the monkeys inoculated with a fecal specimen; demonstration of the typical histopathologic appearance of poliomyelitis in the brain and cord of the infected monkey or monkeys, and inoculation of guinea pigs and albino Swiss mice with brain and cord emulsion of the test monkeys to rule out infection with other viruses or bacteria. In addition, isolation and identification of the virus from the stools of persons who did not have clinical poliomyelitis was further proved by production of typical signs of infection in passage monkeys injected subdurally with an emulsion of cord and brain material from the test monkeys and demonstration of the characteristic lesions in the brain and cord of the passage monkeys.

To date specimens of feces from 4 patients, 38 contacts and 14 normal controls have been injected into monkeys and the partially completed results from these primary inoculations are presented in table 2.[4]

Virus has been isolated from the stools of 3 of the 4 patients. The basic criteria for identification of the virus were met in all 3 instances; the additional criteria set up for contacts were also met in the 1 case in which this was attempted.

Virus has apparently been isolated from 6 of the 38 contacts so far studied. As indicated in table 2, 4 of

2. Howe, Howard A., and Bodian, David: Untreated Human Stools as a Source of Poliomyelitis Virus, J. Infect. Dis. **66**: 198-201 (May and June) 1940.

3. Trask, James D.; Paul, John R., and Vignec, Alfred J.: Poliomyelitis Virus in Human Stools, J. Exper. Med. **71**: 751-763 (June) 1940.

4. Since this paper was presented for publication, virus has been found in the stools from two additional contacts.

the 6 contacts from whom virus was isolated were in the group around the lemonade stand and includes contact D. One, contact B, was in contact with patients 3 and 4 before and at the school picnic, and the sixth was a playmate contact of patient 5.

The primary virus isolations were confirmed by histopathologic findings and by monkey passage in 4 of the contacts. Guinea pigs and mice inoculated with this material remained asymptomatic. Confirmation studies on the remaining two virus isolations from contacts are in progress.

Fourteen control stool specimens have been inoculated up to the present time. Although some of the monkeys exhibited high temperatures after short incubation periods, there was no evidence of paralysis in any of the monkeys inoculated with the control specimens. The cause of this atypical febrile reaction is being investigated.

As indicated in table 2, we have yet to study the feces from 1 case, 10 contacts and 11 controls. We are also studying the persistence of the virus in the stools of cases and contacts.

SUMMARY

A combined clinical, epidemiologic and laboratory study of a suburban outbreak of poliomyelitis has been partially completed. Typical clinical findings in the cases and demonstration of the specific pathology of the disease in one of the fatal cases, and isolation of the poliomyelitis virus from the feces of patients proved it to be an outbreak of poliomyelitis.

The virus of poliomyelitis was isolated from the feces of 3 of 4 patients collected about one month after the onset of symptoms.

The virus was found in the stools of 6 [4] of 38 contacts; on the other hand, there has been failure to isolate the virus from 14 control specimens of feces from normal residents in the community.

Virus was found in the stools of two presumably healthy children who were in contact with adult members of their families who became ill with poliomyelitis.

Virus has been isolated from a presumably healthy person two months after his contact with persons who became ill with poliomyelitis and one month after contact with his father, who died of poliomyelitis.

737 South Wolcott Avenue.

What Is Medical Research?—Mere recording of observations and reading the dials of complicated instruments of precision is not research. Becoming acquainted with all the doctrines, axioms and concepts in a particular field is not research, though it may well precede research. Summarizing or compiling facts is not research. A research man must know his data and how they were obtained. The mere compiler can be ignorant of his material. Such records, without a hypothesis to explain the cause or correlation of some element or aspect they present, and a fresh test of that theory, are merely records. Long study is not research; study alone is passive. It may be swallowing but it is not digestion. Rationalizing and contemplating lack the confirmation secured by testing the proposed explanation. Analysis is a valued element of research method but it is not all there is to research. . . . Another confusion lies in mistaking the result for the cause. Research may lead to invention, or invention may call for research, but invention is not research. Indeed, medical research is often handicapped if it is pressed to be immediately applicable. This is rarely understood by the outside. Research is the response to curiosity, not to need.—Gregg, Alan: The Futherance of Medical Research, New Haven, Conn., Yale University Press, 1941.

GASOLINE INTOXICATION

WILLARD MACHLE, M.D.
CINCINNATI

Although poisoning by petroleum distillates has been a recognized clinical condition ever since these products began to find commercial use, few cases have been reported, probably because they are of sporadic occurrence and in cases of mild acute poisoning recovery is usually prompt and complete. Opportunities for harmful exposure are frequent however, and, as gasoline has become a material essential in daily life and its distribution is constantly increasing, intoxication by gasoline will doubtless become more, rather than less, frequent.

The monthly consumption of gasoline in the United States increased from about 1,000,000,000 gallons in 1927 to more than 2,000,000,000 gallons in 1940,[1] and this was due almost entirely to its increased use as a motor fuel. As a result, the persons having a possible exposure to gasoline include greater numbers of motorists and also greater numbers of men employed in its production, distribution and marketing. The number of gasoline service stations has more than doubled in the past fifteen years; there were 226,000 in 1938, and about 100,000 new pumps are put into service each year. Furthermore, the expansion of the motorized divisions and the aviation branch of the armed forces has led and will continue to lead to increasing handling and use of gasoline, under conditions somewhat less than ideal, in certain instances, from the point of view of safety.

THE AGENT

Gasoline is a mixture of petroleum hydrocarbons having a distillation range of from less than 100 to about 400 F. Its composition varies with its source and is never completely known, but in general there are four groups of components—paraffins, olefins, naphthenes and aromatics. Straight run gasoline made from petroleum produced in the United States is principally paraffinic in character and may contain more than 65 per cent of paraffin hydrocarbons. Several crude oils in the western part of the United States, however, yield straight run gasolines which are much more aromatic or naphthenic in character than the general type of fuel, although the total content of aromatic hydrocarbons in these gasolines will probably not exceed 10 per cent. Many foreign crude oils do yield highly aromatic gasolines, notably Borneo petroleum, in which nearly 40 per cent of aromatic hydrocarbons are present in the gasoline fraction. These aromatic hydrocarbons are principally benzene, toluene and the xylenes. All straight run gasolines contain naphthene hydrocarbons in varying proportions, but the content of olefin hydrocarbons is negligible.

The type of chemical compounds present in a gasoline also depends on the way in which it has been made. Vapor-phase cracked gasoline, for example, is highly unsaturated and quite reactive chemically because it contains from 50 to 75 per cent of olefin hydrocarbons. The rest of these gasolines are composed principally of

From the Kettering Laboratory of Applied Physiology, University of Cincinnati College of Medicine.

1. Hubner, W. H., Refinery Technology Division, Ethyl Gasoline Corporation: Personal communication to the author.

aromatic and naphthenic hydrocarbons, there being practically no paraffins present. With improved methods of manufacture designed to give a greater yield, there has been a change in the type of gasoline marketed. In 1925 two thirds of the total production was straight run and natural, consisting mainly of paraffinic hydrocarbons, types which today make up only about 40 per cent of the total, while cracked, reformed or polymerized gasolines, all with a high olefin and aromatic content, make up the remaining 60 per cent.[2]

The physiologic response to the various compounds in and fractions of gasoline varies widely.[3] The unsaturated compounds, especially the aromatics, have definite convulsant effects, while in general the irritant and toxic effects of a given series of like compounds increase with increase in molecular weight.

Two other changes, noteworthy from a toxicologic point of view, have been made in the past fifteen years: both the vapor pressure and the volatility have increased slightly. The 10 per cent point of winter gasoline (160 F. in 1925) was only 125 F. in 1940,[1] and from the standpoint of health hazards this increased volatility is of considerable significance.

Although it is known that the hydrocarbon content of gasoline is the portion that causes poisoning, questions have been raised concerning certain agents which are added to gasoline to increase its effectiveness, particularly tetraethyl lead. This has been used in gasoline continuously since 1926 in concentrations not exceeding (for motor fuel) 1 to 1,260 by volume. Investigations and reports over a span of years have demonstrated that lead poisoning will not result from the use of leaded gasoline as it is usually handled in commerce.[4] The hazard is limited to the manufacture of the tetraethyl lead and the antiknock mixtures, the mixing of these materials with gasoline and the cleaning of tanks in which leaded gasoline has been stored. Numerous reports of lead poisoning caused by the handling of motor fuel containing tetraethyl lead have been brought to my attention, and several published articles have considered this possibility, but in every instance careful investigation has established that plumbism was not a factor in the production of illness.

A number of materials, usually phenolic compounds, particularly polyhydroxy and amino phenols, are often added to gasoline to prevent oxidation during storage and to delay formation of gum.[1] Because of their low vapor pressures and the low concentrations employed (0.001-0.002 per cent), they have no hygienic significance. This is true also of other adjuvants sometimes added to gasoline such as lubricating oils, colloidal graphite and lecithin.

2. Dunstan, A. E., and others: The Science of Petroleum, New York, Oxford University Press, 1938.

3. Lestschinskaja, O.: The Relative Toxicities of Different Benzines, Arch. f. Gewerbepath. u. Gewerbehyg. **4:** 508, 1933. Lazarev, N. V.: The Toxicology of Benzine, Arch. f. Hyg. u. Bakteriologie **102:** 227, 1929. Tschernikow, A. M., and others: Acute Poisoning with Russian Benzine from Baku: Experimental Studies, ibid. **113:** 313, 1935. von Oettingen, W. F.: Toxicity and Potential Dangers of Aliphatic and Aromatic Hydrocarbons, Public Health Bulletin 255, Federal Security Agency, Public Health Service, 1940.

4. Sayers, R. R., and others: Experimental Studies on the Effect of Ethyl Gasoline and Its Combustion Products, Department of Commerce, United States Bureau of Mines, 1927. Final Report of Departmental Committee on Ethyl Petrol, London, Ministry of Health, 1930. Leake, J. P., and others: The Use of Tetraethyl Lead Gasoline in Its Relation to the Public Health, Public Health Bulletin 163, United States Treasury Department, Public Health Service, 1926. Kehoe, R. A.; Thamann, F., and Cholak, J.: An Appraisal of the Lead Hazards Associated with the Distribution and Use of Gasoline Containing Tetraethyl Lead: Part I, J. Indust. Hyg. **16:** 100, 1934; Part II, ibid. **18:** 42, 1936. Kehoe, R. A., and Machle, Willard: The Occupational Lead Exposure of Men Engaged in Mixing Tetraethyl Lead with Gasoline, unpublished data.

ETIOLOGY

Gasoline intoxication occurs with considerable frequency outside the petroleum industry;[5] substitution of gasoline for solvents, its industrial use and careless handling are chiefly responsible. Severe chronic gasoline poisoning has occurred in dry cleaning plants; the pressing of clothes still damp with gasoline is dangerous because high temperatures volatilize the more toxic, heavier fractions, and the toxicity is said to be likewise increased.[6]

Gasoline is sometimes ingested accidentally, usually by children but also by motorists attempting to siphon it from tanks. Water from wells contaminated by gaso-

5. These references include:

Battley, J. C. S.: Effect of Liquid Gasoline on Pulmonary Tissue, J. A. M. A. **94:** 1570 (May 17) 1930.
Bevill, C.: A Case of Petroleum Poisoning, Therap. Gaz., Detroit **11:** 604, 1895.
Bieder, L.: Chronic Polyradiculitis with Albuminocytologic Dissociation of Cerebrospinal Fluid (Guillain-Barré Syndrome) Probably Due to Benzine Intoxication: Two Cases in Workers, Wien. med. Wchnschr. **88:** 116, 1938.
Conrads, H.: Cases of Petroleum Poisoning in Children, Berl. klin. Wchnschr. **33:** 982, 1896.
Coste, F., and Wolz, G.: Gasoline Poisoning in Two Workmen, Ann. de méd. lég. **15:** 909, 1935.
Desoille, H., and Antoine, G.: Intoxication from Mixture of Carbon Tetrachloride and Benzine Used for Shampoo, ibid. **16:** 155, 1936.
Dorendorff: Benzine Poisoning as an Industrial Disease, Ztschr. f. klin. Med. **43:** 42, 1901.
Friediger, A.: A Case of Acute Benzine Poisoning in a Nursling, München med. Wchnschr. **59:** 252, 1912.
Frumin, L. M., and Fainstein, S. S.: Benzine Poisoning, Zentralbl. f. Gewerbehyg. **11:** 161, 1934.
Girino, G.: Behavior of Urinary Sulfates in Individuals Working with Benzene and Benzine, Med. d. lavoro **29:** 138, 1938.
Gran, B.: A Case of Occupational Benzine Poisoning with Prevailing Syndrome of Anemia, Gazz. d. osp. **54:** 643, 1933.
Haden, R. L.: Benzine Poisoning with Report of a Case, Bull. Johns Hopkins Hosp. **30:** 309, 1919.
Harris, L. I.: A Clinical Study of the Frequency of Lead, Turpentine and Benzine Poisoning in Four Hundred Painters, Arch. Int. Med. **22:** 129 (Aug.) 1918.
Ibanez, M. M.: Dangers of Poisoning in the Industries Using Gasoline and Benzene, Farm. med. **47:** 707, 1936; Chimie et industrie **36:** 729, 1936.
Kuntzen, H.: Thrombosis, Embolism and Chronic Poisoning from Benzine-Benzene Mixture, Ztschr. f. ärztl. Fortbild. **29:** 663, 1932.
Lemere, F.: Chronic Gasoline Poisoning, Colorado Med. **33:** 409, 1936.
Looft, Axel: Gasoline Vapors as a Cause of Occupational Disease, Med. rev. Bergen **47:** 1, 1930.
McNally, W. D.: Industrial Solvents, Indust. Med. **7:** 295, 1938.
Merkel, H.: Medicolegal Aspects of Death Following Intravesical Injection of Benzine: Case, Deutsche Ztschr. f. d. ges. gerichtl. Med. **13:** 237, 1929.
Nielsen, O. I.: Fatal Case of Benzine Poisoning, Ugesk. f. læger **93:** 1178, 1931.
Norsa, G.: Occupational Benzinism, Gazz. d. osp. **54:** 1209, 1933.
Roth, O.: Acute Poisoning with Solvent Benzine, Arch. f. Gewerbepath. u. Gewerbehyg. **4:** 727, 1933.
Rosenthal, E.: Benzine Poisoning and Misuse of Benzine, Zentralbl. f. inn. Med. **15:** 281, 1894.
Santesson, C. G.: Chronic Poisoning from Coal-Tar Benzine: Four Cases, Arch. f. Hyg. u. Bakt. **31:** 336, 1897.
Segitz, A. F. G.: Dangers of Benzine in Cleaning Establishments, Zentralbl. f. Gewerbehyg. **7:** 298, 1930.
Siemon, O.: A Case of Poisoning Following the Inhalation of Large Quantities of Benzine, Monatschr. f. Unfallh. **3:** 366, 1896.
Sserdjukoff, M., and Tschebyschewa: Possibility of Effects of Benzine Industry upon Women, Arch. f. Frauenk. **18:** 255, 1932.
St. Leger, A. W.: Inhalation of Petrol, M. J. Australia **1:** 300, 1922.
Torrealba, J. F.: Dangers of Industrial Plants Using Poor Grade of Gasoline, Gac. méd. de Caracas **44:** 359 and 375, 1937.
Undritz, E.: Occupational Intoxication Due to Vapors of Benzine, Resin and Linseed Oil: Case, Progrès méd., 1938, p. 569.
Varga, L.: Intravenous Benzine Poisoning, Orvosi hetil. **82:** 926, 1938.
Waring, J. I.: Pneumonia in Kerosene Poisoning, Am. J. M. Sc. **185:** 325, 1933.
Witthauer: A Case of Benzine Poisoning, München. med. Wchnschr. **43:** 915, 1896.
Wolff: Poisoning of Chauffeur from Inhalation of Gasoline, Prakt. Arzt **13:** 548, 1928.
Bricker, Elizabeth B.: Report on Volatile Solvents, American Public Health Association Year Book, 1932-1933, p. 138.
Albaugh, R. P.: The Dangers Connected with the Spray Method of Finishing and Decorating, Ohio State Department of Health, 1915.
von Boltenstern: A Mild Case of Benzine Poisoning in a Child, Zentralbl. f. Kinderh. **2:** 75, 1897.
Rochkor, A.: Benzine Poisoning in a Boy One and One-Half Years Old, München. med. Wchnschr. **77:** 1507, 1930.
Review of Literature Dealing with Health Hazards in Spray Painting, Bulletin 15, National Research Council of Canada, 1930.
Cazeneuve, Tanon and Neveu.[31] Dautrebande and others.[24] Dorner.[34] Duvoir and others.[32] Floret.[33] Jansen.[37] Johnstone.[31] Kalinowsky.[38] Nunn and Martin.[10] Potts.[35] Ruttin.[36] Racine.[28] Schneider.[8] Schwarz.[11] Siwe.[7] Stiefler.[23] Klare.[26] Wichmann.[20]

6. Liftschutz, I. I.: Effects of Temperature Conditions on the Toxicity of Automobile Gasoline, Hig. truda tekh. Bezopasmoti **13:** 12, 1935; Chimie et industrie **36:** 62, 1936.

line is an infrequent source of poisoning. The single oral dose usually fatal to man is approximately 7.5 Gm. per kilogram, but death has been caused by as little as 10 Gm.[7] and recovery has followed the ingestion of 250 Gm.[8] This divergence may be due in part to the wide variability in the chemical composition of gasoline; it is absorbed more quickly if it contains a high concentration of benzene and other aromatic hydrocarbons, since the solubility product of benzene in blood, like the coefficient of water solubility, is from three to four times as great as that of natural gasoline.[9] Other factors are also of importance, however. In the most serious of Nunn and Martin's cases,[10] some of which were fatal, there was evidence that liquid had been aspirated. Emesis and the time interval between the ingestion and its occurrence are also of great importance, since they influence the effective dose retained. Individual susceptibility and the presence of food and fats in the stomach, tending to delay absorption, must be considered. It is probable that some habituation occurs on repeated ingestion. Schwarz's[11] patient drank from 3 to 5 cc. of gasoline once or twice daily for from five to six weeks and recovered from the effects.

There is no conclusive evidence that systemic poisoning from gasoline can be produced in man by cutaneous absorption alone. In Lassar's case[12] gasoline was applied to the skin as a remedy for scabies, and death followed in two days, but inhalation probably played a role. Friedeberg[13] states that sufficient gasoline can be absorbed through the skin to cause intoxication, but from my own observations the hazard from cutaneous absorption in man would seem to be slight indeed and of little practical importance when compared with the exposure to vapor that usually coexists. Lasareff's experiments[14] indicate that definite absorption occurs through the skin of rabbits.

The usual mode of absorption of gasoline is through the respiratory tract. As in the case of other volatile materials, if the concentration of gasoline vapor in air is high, absorption through the lungs may be extremely rapid and symptoms may appear after a few minutes of exposure. There is no agreement as to the amounts necessary to cause intoxication. The Massachusetts code[15] sets the maximum allowable concentration at 1,000 parts per million (4.5 mg. per liter), and this is close to the figure given by Fieldner.[16] We feel, however, that it may be too high for continuous work. Susceptible persons may show symptoms after exposure to concentrations as low as 300 to 500 parts per million, for example the functional neuroses in rubber workers reported by Vigdortschik[17] following exposure to concentrations of 110 to 450 parts per million. In Fieldner's test, men exposed to 1,000 parts per million showed drowsiness, dulness and numbness at the end of fifteen minutes and vertigo, ataxia and slight nausea as well at the end of an hour. Symptoms appeared much more quickly with exposures to 3,000 parts per million, and with exposure to 7,000 parts per million there was definite intoxication in five minutes.

Few data are available on the amounts of gasoline vapor in air that will cause death in man in a short period of exposure, but amounts in excess of 10,000 parts per million are rapidly fatal for most experimental animals. Since gasoline vapor is heavier than air, concentrations far in excess of these may readily occur if gasoline is decanted or exposed to air in enclosed places and concentrations rapidly fatal to man may be formed. Moreover, in tanks, excavations and other poorly ventilated enclosures the displacement of air by the heavier vapors adds the further hazard of asphyxia.

Susceptibility to gasoline vapor varies greatly, and habituation is a usual phenomenon, as we learned in a study of men engaged in filling barrels with gasoline in a poorly ventilated location.[18] The reason is not understood. Experiments attempting to relate habituation to changes in the blood lipids have given conflicting results.[19] Since gasoline is apparently not oxidized or broken down to any significant degree in the body (excretion is mainly by way of the lungs), this question must remain unanswered for the present.

PATHOLOGY

The pathologic changes caused by gasoline are dependent on both its irritant action and its lipolytic activity. There is no characteristic general morbid anatomy, but study of reports[20] reveals almost uniformly damage to the lungs manifested by hyperemia, petechial hemorrhages, subpleural extravasations and, in some cases, gross pulmonary hemorrhages which may involve the entire lobules, with the alveoli filled and the epithelium necrotic. Bronchitis is frequent. Pleural effusion was an outstanding finding in 1 case reported by Johnstone.[21] Some degree of pneumonitis is usually present, especially if the gasoline has been ingested and aspiration has occurred, or simply as the result of its excretion by the lungs. Although as a rule most pronounced in the lungs, damage to the vascular endothelium is seen in many tissues, such as subserous

7. Siwe, S. A.: Symptoms of Acute Poisoning from Liquid Hydro-Carbons of the Aliphatic Series (Benzine and Petroleum): Two Cases, Monatschr. f. Kinderh. **55:** 146, 1932.

8. Schneider, H.: Acute Benzine Poisoning, Med. Klin. **29:** 1168, 1933.

9. Lasareff, N. V.: Benzine and Benzene Contents of Blood Depending on Different Ways of Introducing These Poisons into the Organism, Biochem. Ztschr. **242:** 377, 1931. Bamesreiter, Otto: Neue Versuche über die quantitative Giftigkeit von Benzol- und Benzindämpfe, Arch. f. Hyg. **108:** 129, 1931.

10. Nunn, J. A., and Martin, F. M.: Gasoline and Kerosene Poisoning in Children, J. A. M. A. **103:** 472 (Aug. 18) 1934.

11. Schwarz, H. G.: Chronic Benzine Poisoning, Deutsche med. Wchnschr. **58:** 449, 1932.

12. Lassar, cited by Johannessen, A.: A Case of Fatal Petroleum Poisoning in a Girl Two Years Old, Norsk mag. f. lægevidensk **11:** 565, 1896; translated, Berl. klin. Wchnschr. **33:** 317, 349, 1896.

13. Friedeberg: Intoxication by Petroleum, Zentralbl. f. inn. Med. **33:** 1042, 1902.

14. Lasareff, N. V.: The Permeability of the Skin for Benzine and Benzene, Arch. f. Hyg. **106:** 112, 1931.

15. Bowditch, Manfred, and others: Code for Safe Concentrations of Certain Common Toxic Substances Used in Industry, J. Indust. Hyg. & Toxicol. **22:** 251, 1940.

16. Fieldner, A. C.; Katz, S. H., and Kinney, S. P.: Permeation of Oxygen Breathing Apparatus by Gases and Vapors, Technical Paper 272, United States Department of Commerce, Bureau of Mines.

17. Vigdortschik, N. A.: Symptoms of Chronic Benzine Poisoning, Vrach. delo **15:** 597, 1932; The Problem of the Chronic Action of Benzine on the Organism, Zentralbl. f. Gewerbehyg. **10:** 219, 1933.

18. Kehoe, R. A., and Machle, Willard: Unpublished data.

19. Schustrow, N., and Letawet, F. K.: Significance of Fatty Substances in Benzine Poisoning, Deutsches Arch. f. klin. Med. **154:** 180, 1927. Schmidtmann, M.: Experimental Studies on the Effect of the Inspiration of Small Quantities of Benzine and Benzene upon the Respiratory Organs and the Entire Body, Klin. Wchnschr. **9:** 2106, 1930. Lasareff, N. V., and others: On Benzine Habituation, Arch. f. exper. Path. u. Pharmakol. **159:** 345, 1931. Brusilovskaya, A. I.: Role of Fats and Lipoids of Blood in Absorption of Benzine and Benzene Vapors, Fiziol. zhur. **19:** 587, 1935; Blood Lipoids and Anesthetics, Arch. internat. de pharmacodyn. et de thérap. **50:** 289, 1936. Nikulin, M., and Hetmann, Z.: Action of Benzine on Blood Fats and Lipoids, Arch. f. Gewerbepath. u. Gewerbehyg. **4:** 653, 1933.

20. Wichmann, F. W.: Development of Gas Phlegmon After Accidental Injection of Benzine: Case, Zentralbl. f. Chir. **59:** 2655, 1932. Heitzmann, O.: Comparative Pathologic Anatomy of Benzene and Benzine Poisoning, Arch. f. Gewerbepath u. Gewerbehyg. **2:** 515, 1931. Lewin, I. E.: Pathologic Changes and Functioning of Reticuloendothelial System in Poisoning from Benzine Vapors, ibid. **3:** 340, 1932. Jaffe, R.: Benzine Poisoning: Necropsy Findings and Animal Experiments, München. med. Wchnschr. **61:** 175, 1914. Duvoir and others.[23] Jansen.[37] Nunn and Martin.[10] Lassar.[12] Loewenberg.[30]

21. Johnstone, R. T.: Pleural Effusion from Gasoline Inhalation, Indust. Med. **7:** 243, 1938.

hemorrhages in the liver, kidney and spleen and hemorrhages into the serous cavities in animal experiments. In addition, there is evidence of general damage to the parenchymatous organs. The liver may be enlarged and show cloudy swelling, usually centrolobular, and there may be fatty changes. In the kidney, edema may be considerable; damage is mainly in the proximal convoluted tubules and the glomeruli, where lipid degenerative changes are seen, with deposits of albuminous material within the glomerular spaces.

Few studies of the nervous system in acute poisoning have been reported, and the changes described are not specific. Hyperemia and edema of the brain and meninges are usually present, and perivascular extravasations occur here as elsewhere. Myelin swelling is usual, and, in 1 case [22] in which peripheral neuritis had resulted from the poisoning, part of the fibers were partially denuded of myelin, with gross swelling of the nerves.

As in any acute general intoxication, the types and degree of pathologic change are influenced by the interval between ingestion or exposure and death. If death occurs within a few minutes or hours, few changes may be seen other than edema of the lungs and central nervous system and congestion and scattered hemorrhages, especially in the lungs. If days or weeks elapse, one sees in addition variable degrees of necrosis in the lungs, cellular reaction, fibrin deposits, blood pigment and regenerative changes in the liver and kidneys.

In chronic poisoning the anatomic changes are neither pronounced nor specific. Following ingestion, dilatation of the stomach is usual, as well as hyperemia and edema of the enteric mucosa. Submucosal and interstitial hemorrhages may be present. Hepatic and renal sclerosis were reported in 1 case of chronic involvement.[22]

SYMPTOMS AND SIGNS

Acute Intoxication.—Acute poisoning is characterized by severe symptoms in the central nervous system. When exposure is to very high concentrations of gasoline vapor in air, such as may occur in tanks, the victim falls to the ground in a comatose state and may die at once or within a few hours without regaining consciousness. When death is somewhat delayed, the onset of coma may be less rapid and the acute anesthetic action of the gasoline may cause initial symptoms like those of acute alcoholic intoxication: a brief period of incoordination, restlessness and great excitement, with combativeness and swearing, mental confusion, disorientation, ataxia and possibly disturbances of speech and of swallowing. Delirium follows, and coma, which may last for a few hours to several days. The type of coma seems to be dependent to a considerable degree on the chemical nature of the gasoline. In general, paraffin hydrocarbons produce a relatively quiet coma, as has been demonstrated by animal experimentation. Unsaturated hydrocarbons, particularly the aromatic series, cause convulsions, motor unrest, tremors and motor disturbance. Extreme jactitation has been noted frequently, particularly in the animal experiments of Haggard,[23] and muscular twitching is common. Meningismus may be present. In severe cases epileptiform convulsions are frequent, and they may continue for some time after the coma has passed.

The pulse shows variable changes. Usually weak and rapid in the early stages of coma, it is often full in the presence of considerable motor unrest; bradycardia was noted in several cases, however, and was attributed to stimulation of the vagus nuclei. In general the pulse returns slowly to normal with recovery. A peripheral vasomotor paralysis or acrocyanosis is frequently found and is apparently the result of direct action of the agent on the vessels, since drug response is abolished.[24] The temperature is usually subnormal but a rise in temperature of 1 to 2 degrees is seen occasionally, and in very sick patients and in terminal states it has reached 106 F. Respirations are usually shallow and rapid, particularly if poisoning has been by ingestion with some aspiration. Irregularity of respiration is common, particularly in children, and sudden apnea may occur when the patient seems to be doing well.[10]

In quiet coma the superficial and deep reflexes are absent or extremely weak, but with jactitation and convulsions, meningismus and violent motor unrest they may be greatly increased, almost to the point of clonus. Unilateral and bilateral reversal of the plantar reflex may be seen. The disks are usually pale. The pupils are dilated, as a rule, and may be unequal. Often they are fixed, and varying degrees of nystagmus may be present. Conjugate deviation has been noted frequently, as has strabismus. Other cerebellar symptoms may be prominent, and there may be asynergia and adiadokocinesis. Vomiting and singultus sometimes occur during coma and may persist long after.

In cases of subacute involvement in which symptoms may not appear for several hours there are various premonitory symptoms: headache, usually described simply as a feeling of pressure over the head, blurred vision, vertigo, ataxia, tinnitus, nausea and anorexia, weakness and in some cases general abdominal pain. With these symptoms there develops a state of intoxication like that produced by alcohol, known as "naphtha jag." The sensation may be pleasurable and persons have been known to inhale gasoline vapors intentionally, but for the most part the patient becomes quarrelsome and combative, swears violently and evinces a poorly controlled behavior.

Whether or not this prodromal period is followed by more serious symptoms depends on two factors: the duration of the exposure and its constancy. Because of the low solubility of hydrocarbon vapor in blood, exposure must continue for some minutes to bring about conditions of equilibrium and maximum effect.

Under most conditions of exposure in the ranges that cause subacute poisoning, the concentrations are not constant but vary within rather wide limits, and any sudden great increase in concentration will be quickly followed by more severe symptoms.

If poisoning has been by ingestion, with no aspiration of the gasoline, symptoms develop more slowly than in poisoning by inhalation, because of the slow rate of absorption of the agent from the intestine.

Chronic Intoxication.—This term is applied to poisoning which results from exposure to low concentrations of gasoline vapor for long periods of time; severe acute

22. Duvoir, M., and others: Question of Existence of Polyneuritis Caused by Benzine as Occupational Disease: Case of Hyperchromic Pernicious Anemia and Polyneuritis in Woman Working with Benzine, Bull. et mém. Soc. méd. d. hôp. de Paris **54**: 359, 1938.

23. Haggard, H. W.: The Anesthetic and Convulsant Effects of Gasoline Vapor, J. Pharmacol. & Exper. Therap. **16**: 401, 1920.

24. Dautrebande, L., and others: Paralysis of Peripheral Vasomotor System by Benzine: Epinephrine-Benzine Syncope, Compt. rend. Soc. de biol. **117**: 90, 1934.

symptoms do not appear, but minor symptoms of a general nature are manifested a few weeks or months after the exposure has started and become progressively worse. The patient may become disabled in a month or in several years.

Considerable difference of opinion exists as to the incidence of chronic gasoline intoxication. Hamilton [25] states that chronic naphtha poisoning is probably common. Our experience indicates that it is rare. We have had more than 2,300 refinery workers under observation, in some instances for as long as ten to twelve years, and have found no signs of chronic gasoline poisoning in any case.[18] Most of these men were employed for brief periods of time, usually not more than a few hours a week, in mixing ethyl fluid with gasoline and for the remainder of their time in all types of refinery work entailing gasoline exposures of all types and degrees of severity. Negative results, in respect to signs of chronic gasoline intoxication, were also obtained in studies of large numbers of filling station attendants, tank wagon drivers and garage mechanics.

On the other hand, in a group of barrel fillers, exposed to concentrations of gasoline vapor tolerable only to habituated persons, we found undernutrition and pallor and significantly low values for hemoglobin and erythrocytes in a high proportion of the subjects. There were frequent complaints of anorexia, nausea and nervousness, and these symptoms were usually related either to a return to work following an interval of freedom from exposure or to brief periods of increased exposure. The condition of these men may be considered one of chronic intoxication or the result of repeated subacute episodes with injury cumulative to a degree.

The clinical manifestations in chronic gasoline intoxication are usually reported to be vague and not characteristic. In Spencer's study [26] of 22 persons exposed to gasoline vapors from coupon-canceling machines, the principal symptoms noted were headaches, vertigo, drowsiness, conjunctival irritation with lacrimation, excitability and mild nervous symptoms. A high incidence of dispensary attendance, also noted, might not have been significant had it not been lowered to control levels after kerosene was substituted for gasoline in the operation.

The first symptoms to appear in chronic intoxication are those of a general nature or psychasthenic and neurasthenic manifestations, and they are followed by muscular weakness and cramps, listlessness and a feeling of dulness, fatigue and loss of weight. This loss may reach high proportions: for example, Hayhurst's [27] patients lost from 10 to 60 per cent of their body weight over a period of months. Irritative properties of the vapor usually cause conjunctivitis with lacrimation and cough with expectoration. Pulmonary hemorrhage has been reported [28] but is uncommon.

Symptoms on the part of the central nervous system occur in wide variety and degree. They may be listed as follows: mental confusion, loss of memory, a sense of impaired mental faculties, depression, irritability and nervousness; listlessness and dulness sometimes associated with pronounced apathy; some degree of ataxia, possibly with tremor; numbness, paresthesia, muscular pain perhaps lancinating, pains in the limbs, nerve tenderness, neuritis and paralysis of peripheral or cranial nerves of the chronic type and associated with but little pain and either motor, sensory or mixed. Cerebellar signs, often overshadowed in cases of acute or of subacute involvement, may be the only finding. Ataxia may be accompanied by incoordination and cerebellar gait. Vertigo, one of the frequent and early signs, may be severe and associated with nystagmus, tinnitus and impairment of hearing. Drowsiness by day may be followed by insomnia by night. Retrobulbar neuritis has been reported.[29]

When other symptoms are present, indigestion is usual and morning anorexia may be associated with some nausea, rarely with vomiting. Generalized abdominal pain is a frequent complaint, and there may be either constipation or diarrhea. Changes on the part of the circulatory system are not considerable. The pulse rate is usually increased.

LABORATORY EXAMINATIONS

Laboratory findings are not remarkable. In acute and subacute intoxication the blood changes are not characteristic; the erythrocyte count is influenced to a great extent by the degree of hemoconcentration and the varying effects of hemorrhage, and the picture, both in the blood and in the marrow, may be further complicated by the effects of benzene present in the gasoline. A reduction in number of erythrocytes and in the hemoglobin content reported as occurring in some cases has been obscured by hemoconcentration in others. The leukocyte count tends in the main to be somewhat elevated and, when pneumonitis is present, may be as high as 20,000 to 30,000, with a relative increase in granulocytes, this increase obtaining shortly after exposure. Later the leukocyte count will be further influenced by the degree of secondary infection in the pneumonitic areas. Moderate eosinophilia of from 3 to 6 per cent has been reported in a number of cases but is not of sufficiently consistent occurrence to have diagnostic value.

The specific effect of gasoline, or benzene, on the blood seems to be elicited only in chronic intoxication. In cases of chronic gasoline poisoning some degree of anemia is usual. Hemoglobin may vary from 60 to 90 per cent, with 3 to 4 million erythrocytes. Leukocytes are little changed, usually slightly increased. In those cases in which leukopenia has been reported there has usually been exposure to gasoline of high benzene content. Thrombopenia, purpura and epistaxis may also occur.

Changes in the blood chemistry are not significant. Urea and total nitrogen may be slightly increased in the presence of acute symptoms. Blood sugar is usually within normal limits. Loewenberg [30] noted that in experimental animals the blood cholesterol may be halved, but in man it is only slightly decreased. The assumed direct relationship between concentration of

25. Hamilton, Alice: Industrial Poisons in the United States, New York, Macmillan Company, 1925, chapter 28, pp. 400-409.

26. Spencer, O. M.: The Effect of Gasoline Fumes on Dispensary Attendance and Output in a Group of Workers, Pub. Health Rep. **37:** 2291 (Sept. 22) 1922.

27. Hayhurst, E. R.: Poisoning by Petroleum Distillates, Indust. Med. **5:** 53, 1936.

28. Klare: Benzine Poisoning, Aertzle. Sachsverst.-Ztg. **13:** 93 and 116, 1907. Racine: Fatal Benzine Poisoning, Vrtljschr. f. gerichtl. Med. **22:** 63, 1901. Loewenberg.[30]

29. Peters: Retrobulbar Neuritis from Chronic Benzine Poisoning, Deutsche med. Wchnschr. (supp.) **26:** 249, 1900.

30. Loewenberg, R. D.: Practical Significance of Benzine, Benzene and Their Combustion Products in Industry, Occupations and Traffic, Fortschr. d. Med. **50:** 394; 433 and 478, 1932.

blood lipids and susceptibility to intoxication has not been confirmed.

Albuminuria occurs in from 10 to 20 per cent of cases and usually appears three or four days after exposure.

SEQUELAE

Mild, nondisabling sequelae probably follow acute intoxication more often than has been reported. Unless severe and persistent, sequelae are difficult of interpretation and simultaneous exposure to other noxious agents, such as carbon monoxide,[31] often complicates the picture. Serious, clear-cut sequelae have been limited to cases in which exposure was by inhalation, except for one case of Schwarz,[11] in which severe polyneuritis lasting seven months followed the daily ingestion of from 3 to 5 cc. of gasoline for a period of from five to six weeks.

The most common of the sequelae are peripheral neuritis, impairment of memory, dulness of intellect, numbness of the extremities, cranial nerve palsies, retrobulbar neuritis and epileptiform seizures. Thus they are limited almost entirely to the central nervous system, although chronic pneumonitis has also been reported in 2 cases.

Epileptic attacks are by far the most serious sequela to acute intoxication. Four instances, 3 of them rather sketchily reported, are on record. In Johnstone's[21] case acute intoxication from inhalation was followed twenty-four hours later by coma and convulsions, with clonic twitching on the right side. The patient recovered in seven days and worked for two months, at which time he suffered another attack of coma and convulsions in the absence of exposure. During the attacks the pupils were fixed and unequal and there was conjugate deviation and a Babinski reflex was elicited. In the succeeding eighteen months seizures continued, without loss of consciousness in the mild attacks. Examination at this time showed mainly left-sided focal cerebral symptoms, conjugate deviation and the Babinski reflex, with inequality of the tendon reflexes, unilateral muscular twitchings and a fixed facial expression. In Floret's case,[32] that of a young girl who suffered an acute attack from the inhalation of vapors, followed by excitement, coma and convulsions, repeated convulsive seizures and periods of excitement recurred frequently for one year after recovery from the acute attack. In the interval, neurologic examinations gave negative results except for slow pupillary reaction. Stiefler[33] reported a case in which coma lasted for three or four days and epileptiform seizures began four or five months after the acute attack. Neurologic examinations gave negative results; the ultimate outcome was not stated. Schneider[8] made a brief report of a case in which there were retrobulbar neuritis, symptoms associated with degeneration of the cord tract and epileptiform seizures.

Neuritis and paresthesia are not uncommon following acute attacks but do not usually persist; in some cases, however, severe cord or neuritic symptoms have persisted for years. In Dorner's case,[34] in which an acute attack caused three days of coma, symptoms of cord disease developed seven months later, and two years after exposure the patient was still suffering from weakness, numbness of the right hand, intention tremor, unequal pupils, nystagmus, patchy disturbances of sensation, astereognosis, adiadokocinesis and unequal reflexes, a positive Babinski reflex and ataxia. The lesions simulated multiple sclerosis or combined cord diseases, but they were excluded clinically. Potts's[35] patient, after four months of variable exposure, had an episode of acute intoxication in which acute symptoms including total external ophthalmoplegia appeared. Coma lasted for hours and the patient was somnolent for eleven days. Four months later he still had paralysis of the third nerve on the left side and weakness of the left arm. A similar case reported by Ruttin[36] had as its sequel paralysis of the third nerve, persistent vertigo and past pointing. In one of Jansen's[37] cases neuritic phenomena developed six weeks after a single severe exposure and progressed steadily. The acute attack was accompanied by coma, mania and confusion lasting for ten hours. The patient's condition was greatly improved in forty-eight hours and he returned to work on the nineteenth day. Six weeks later, weakness, anorexia, headache, insomnia, peripheral nerve tenderness, irregular reflexes and ataxia were noted, and three and one-half years later recovery was not complete. Neurasthenia, areas of paresthesia and transitory neuritic pains persisted. In another case reported by Jansen[37] acute intoxication followed inhalation, with tremor, motor unrest and general convulsions. The patient left the hospital in eleven days but on the seventeenth day he complained of headache and tremor and a year later he was found to have facial weakness and deviation of the tongue for which no other cause could be found. Kalinowsky[38] reported a case in which an acute attack with multiple hemorrhages and thrombopenia was followed five weeks later by the appearance of painful median neuritis with paralysis of all the muscles supplied. This remained complete for at least one year.

From the cases cited it may be seen that the sequelae of acute gasoline intoxication can involve the higher centers, can be general or focal and can be limited in large part to the cord or to the peripheral nerves. This great variability in kind and in behavior, on the part of the sequelae, is in keeping with the variability in behavior displayed by both acute and chronic intoxication.

DIAGNOSIS

As a rule, acute poisoning offers little difficulty in diagnosis. There is a history of exposure, and the odor of gasoline usually clings to the clothes and skin, sometimes for days. If poisoning has been by ingestion, both vomitus and washings from lavage will have this smell for as long as four days. It will also be detected in the expired air for hours if exposure has been to high concentrations.

There is little that is characteristic about the patient's general appearance. In those who lie quiet, the vasomotor collapse, cold extremities and cyanosis may simulate shock. When muscular twitchings and jactitation

31. Cazeneuve, Tanon and Neveu: Frequent Cause of Automobile Accidents: Bulbar Intoxication by Gasoline Fumes and Carbon Monoxide, Ann. d'hyg. **11**: 272, 1933, Bull. Acad. de méd., Paris **108**: 1624, 1932. Ruttin.[36]

32. Floret: Recent Observations on Industrial Injury from Hydrocarbons, Zentralbl. f. Gewerbehyg. **3**: 7, 1926.

33. Stiefler, G.: Benzine Poisoning Followed by Epilepsy: Case, Wien. med. Wchnschr. **78**: 938, 1928.

34. Dorner, G.: Acute Benzine Poisoning Followed by Disease of the Spine, Deutsche Ztschr. f. Nervenh. **54**: 66, 1915.

35. Potts, C. S.: A Case of Probable Encephalitis Due to Inhalation of the Fumes of Gasoline, J. Nerv. & Ment. Dis. **42**: 24, 1915.

36. Ruttin, E.: Vertigo and Nystagmus Following Benzine Poisoning, Acta oto-laryng. **23**: 410, 1936.

37. Jansen, H. H.: Nervous Disorders (Sciatic Neuritis, Traumatic Epilepsy) Following Acute Benzine Poisoning, Deutsche Ztschr. f. Nervenh. **144**: 68, 1937.

38. Kalinowsky, L.: Berlin Gesellsch. f. Psych. u. Nervenkr., January, 1928; abstr. Neurol. Zentralbl., 1928, p. 727.

or gross convulsions occur, epilepsy may be simulated. Around petroleum refineries and fields, where the men's clothing usually carries some odor of gasoline, differential diagnosis between acute poisoning by hydrogen sulfide and asphyxia from gasoline intoxication may offer difficulty, but early differentiation is immaterial, since treatment of the asphyxia caused by either agent is the same. Gasoline is frequently handled where internal combustion engines are operating, and consequently gasoline intoxication may be confused with coma and convulsions from carbon monoxide intoxication. The color of the skin and mucous membranes and the finding of carbon monoxide hemoglobin in the blood will serve to identify the latter condition.

Much greater difficulty in differential diagnosis occurs in cases of chronic poisoning and also in the allocation of responsibility for sequelae. Any one of the gastroenteric, cerebral or peripheral neuritic manifestations of chronic gasoline intoxication may occur in infectious, metabolic or degenerative disease, and for this reason great dependence must be placed on the history of exposure to gasoline. Personal inspection of working conditions may be necessary in order to establish the magnitude of the exposure, and the discovery of other cases with similar symptoms in workmen having similar exposure will be of considerable aid.

Sequelae usually do not follow chronic exposure; consequently amelioration of symptoms may be expected to follow cessation of exposure in chronic cases, and this may be the best expedient in establishing the diagnosis. Hysterical or psychoneurotic symptoms in a person with chronic exposure to gasoline should suggest the possibility of intoxication, and relief from these symptoms should follow soon after removal from exposure. In the reported cases in which early multiple sclerosis was simulated, temporal pallor, typical speech and emotional disturbances were absent.

In the interpretation of sequelae it is most useful to remember that severe sequelae have never been recorded except in cases of severe acute intoxication with a history of coma and often of convulsions.

PROGNOSIS

In most cases of acute intoxication there is recovery without serious after-effects; severe sequelae are uncommon. When exposure has been by inhalation the magnitude of exposure or absorption cannot be estimated and prognosis must be based on the patient's condition and clinical behavior. As in other intoxications, prolonged coma or the appearance of convulsions or epileptiform seizures is evidence of severe illness. More definite data are available for exposure by ingestion: In Siwe's [7] series, 50 per cent of the cases in children were fatal. Nunn and Martin [10] reported a mortality of 28 per cent in children after ingestion of gasoline, as compared with 9.2 per cent mortality following ingestion of kerosene. Patients fatally poisoned lived from two to eighteen hours, and all who died had pneumonitis with cyanosis and respiratory difficulty from aspiration. Convulsions occurred in 2 of their fatal cases and in 2 nonfatal, while in one third of their nonfatal cases some aspiration pneumonitis was present.

THERAPY

There is no specific treatment for intoxication with gasoline. Removal from exposure and general management are most important. If the material has been taken by mouth, gastric lavage should be carried out as soon as feasible and should be the first treatment instituted, even though twenty-four or forty-eight hours have elapsed. Gasoline is absorbed only very slowly from the stomach, and washings have had a definite odor of it as long as four days after ingestion. In patients who are comatose, lavage will reduce the frequency of vomiting and will lessen the danger of aspiration of vomitus. If there is no enteritis or diarrhea, saline cathartics and enemas should be given to eliminate any of the material present in the lower part of the bowel.

Embarrassment of respiration is frequent; if breathing stops, artificial respiration should be carried out with oxygen and 6 or 8 per cent carbon dioxide. This treatment was given for eleven hours to a patient aged 2 years, 1 of the series reported by Nunn and Martin.[10] Moreover, since most of the gasoline is excreted by way of the lungs, the course of the acute illness can be definitely shortened if adequate ventilation is secured by administering oxygen and carbon dioxide. Inhalation treatment has the further advantage of lessening the likelihood of pulmonary complications, such as atelectasis and pneumonia, by increasing the respiratory effort and expanding the lungs.

Sudden vomiting or failure of respiration is most likely to occur in the first three or four days of illness, and twenty-four hour nursing attendance is necessary during this time. Dangerous symptoms such as sudden apnea, convulsions or circulatory failure may come on without warning as long as three days after exposure, and the patient should be kept in the hospital under constant observation as long as any active symptoms are present. If evidences of peripheral vasomotor collapse appear, heat should be applied and therapy for the collapse instituted. Response to drugs in the involved vessels is poor and, when possible, physical methods of treatment should be employed. Cardiac stimulants may be necessary; epinephrine should not be used because of its tendency to cause pulmonary edema.

If exposure has been by inhalation, the patient should be removed immediately to fresh air, kept warm and placed in bed as soon as feasible; a cleansing bath should be given to remove any gasoline present on the skin. From this point, the general plan of management is essentially the same as that in poisoning from ingestion, except of course that lavage and cathartics are omitted.

SUMMARY

1. Gasoline is a mixture having a widely variable chemical composition, and poisoning from it produces a variable clinical syndrome. The most prominent symptoms and signs arise from the central nervous system and the gastroenteric tract.

2. The opportunities for exposure to gasoline constitute an increasingly important potential hazard in industry and to the community.

3. Pneumonitis, visceral congestion and hemorrhages are the most frequent pathologic changes.

4. Chronic intoxication from gasoline is rare.

5. Severe sequelae are uncommon and occur only after severe acute intoxication.

6. The history of exposure and estimation of its magnitude are of greatest importance in the diagnosis.

7. Therapy is general and supportive.

Eden Avenue.

Clinical Notes, Suggestions and New Instruments

WESTERN EQUINE ENCEPHALITIS OCCURRING AMONG HUMAN BEINGS IN KANSAS DURING THE SUMMER OF 1941

PRELIMINARY REPORT

JAMES A. WHEELER, M.D., NEWTON, KAN.

During the summer of 1940, Dr. Ketzelman and Dr. Grundaman [1] of Kansas State College made a collection of assassin bugs (Microtonus purcis) in a pasture where horses had died of western equine encephalitis. They found that 50 per cent of the collection were infected with virulent western equine virus. In 1941 collections were again made in different pastures with the same results.

The assassin bug is found mainly in pastures along rocks or ledges. It is a semitropical bug which is supposed to have migrated to North America but is now considered fairly common throughout the Middle West. This bug lives on blood from animals or man. It mates and hibernates after frost and lays its offspring along rodent nests so that the young may feed on the rodents until they are old enough to fly. After it can fly, which is in early May, it may then seek out animals in the pasture, especially horses. The bug feeds at night about once a week. It has been found around street lights and also in homes. The spread of horse encephalitis to human beings becomes apparent through this bug as well as other blood sucking vectors. We have been fairly certain that rodents were playing a role as a reservoir for the virus of western equine encephalitis. Last winter we passed the Lansing strain of virus back to the common rat. It is possible in horses that the assassin bug may light up the infection in the spring and then with the influx of mosquitoes the disease would be spread among both horses and man. With these facts and conjectures before us, we set out first to determine the percentage of western equine encephalitis infection among human beings in Kansas.

TESTS

For this investigation it was decided to obtain specimens of blood from reported cases of encephalitis occurring in man over the state. The Kansas State Board of Health consented to cooperate with us and we chose the serum neutralization test and guinea pigs as the test animals. These tests were to determine the negative and positive findings from the specimens of blood taken from the cases sent in by the Kansas State Board of Health. Four guinea pigs were used for each test. In any case in which there occurred an element of doubt, the tests were repeated. These tests were done by Dr. Lee Roderick, head of the Pathology Department, Kansas State College. No effort was made to test for the St. Louis strain of encephalitis virus. These specimens were taken routinely. The specimens came from a number of counties which included a wide area in Kansas. The final results showed that 50 per cent of the patients tested showed evidence of protection or antibodies against western equine virus.

Reference work in the West has shown that the virus of the St. Louis type of encephalitis is present in certain wild and domestic birds and mammals. Since the St. Louis strain has been passed successfully to the horse, it is thought that there may be more of this type of virus found among horses. It has been shown that horses from Colorado as well as from Montana and Washington possessed neutralizing antibodies for equine or St. Louis virus or both. Experimentally, horses were injected intracerebrally and inoculation was made of a proved strain of St. Louis virus. The resulting infection was indistinguishable clinically from that caused by the western strain of equine encephalomyelitis virus.

Our clinical experience with human beings in this epidemic has shown in clearcut instances that the differential diagnosis on clinical grounds is difficult if not impossible; for example, a white boy aged 8 years in previous good health, whose parents had three weeks before the illness moved to a home near a small stream, had been bitten repeatedly and extensively by mosquitoes. He was sick for three or four days with high temperature. His parents did not call a doctor and it was not until he was up and about that they noticed he was dragging his left foot and he was then brought to the hospital. Examination showed a typical foot drop with anterior paralysis in the left leg, as often occurs in cases of anterior poliomyelitis. The spinal pressure was increased to 26 cm. The cell count was normal. The blood from this boy was tested as a routine measure by the serum neutralization test and to our surprise he gave a strong positive reaction to the western horse virus. Four other patients from our hospital who appeared to have clinical encephalitis had increased spinal pressure, the cell counts ranging from 75 to 100 lymphocytes. These patients were tested by the same method. The latter ones were negative to the equine western horse virus. They were not tested for the St. Louis virus. Of interest is the report of a health officer in Cherokee County, who reported that a man in western Kansas became ill with encephalitis and when he returned some distance to his home one of his horses became ill and died of encephalitis within a period of several weeks. The doctor suggested that the horse could have contracted the disease from this man. The man's blood was tested and found positive for the western equine encephalitis virus.

RESPONSIBILITY OF MOSQUITOES AND WOOD TICKS

Recently Hammon and his co-workers [2] have reported isolation of the western equine and St. Louis viruses from mosquitoes (Culex tarsalis) collected from areas in which cases of human encephalitis occurred. This evidence suggests the vector theory. The Culex tarsalis mosquito is common in Kansas. It is reported that nearly all the cases of equine encephalitis among horses occurred among those which were in the pastures and turned out to graze at night. Those which were kept in the barn at night, it was thought, had some protection. The reported clinical cases of both poliomyelitis and encephalitis have occurred in Kansas from week to week in 1940 and 1941 in a pattern that suggests a ratio population incidence. For example, if 5 cases were reported of either disease it would represent five counties—but 1 case to a county. It was a rare instance in a large county when 2 cases to a county were reported in the same week. In Kansas the incidence of poliomyelitis, encephalitis and equine encephalitis ceases abruptly with the fall frosts.

In the October 18 issue of THE JOURNAL it was reported [3] that in Russia outbreaks of encephalitis occurred a number of years ago. The work among the Russian investigators has shown that wood ticks also played a part in the transmission of the disease. This particular work has probably been overlooked in the past in the light of some of our newer knowledge.

SUMMARY

1. The percentage of western equine encephalitis in reported clinical cases of encephalitis occurring in man in Kansas is being determined.

2. The serum neutralization test was used to determine positive and negative reaction of the patient's blood.

3. In Kansas 50 per cent positive reactions to equine encephalitis were found from the samples of blood taken from cases diagnosed as human encephalitis.

This work was done in conjunction with Kansas State College, the Kansas State Board of Health and the Committee on Child Welfare of the Kansas Medical Society.

1. Ketzelman and Grundaman: Special bulletin report from Kansas State College, 1940.

2. Hammon, W. McD.; Reeves, W. C.; Brookman, B.; Izumi, E. M., and Gjulin, C. M.: Isolation of the Viruses of Western Equine and St. Louis Encephalitis from Culex Tarsalis Mosquitoes, Science **94**: 328-330, 1941.

3. New Developments in Knowledge of Encephalitis, editorial, J. A. M. A. **117**: 1361 (Oct. 18) 1941.

4. The vector theory may prove to be a possible cause of the spread of both the western equine and the St. Louis virus.

5. The question of clinical diagnosis and classification of these diseases including poliomyelitis makes it doubtful, if not impossible, to make such a classification. The serum neutralization test should be used as one of the means to help classify virus infections occurring in human beings.

NOTE.—Further work will be undertaken with the St. Louis virus in the future. All negative reactions to western equine virus will be tested on Swiss mice for the St. Louis strain. These tests will be used as a routine measure next year by the state board of health in all cases of reported poliomyelitis and encephalitis. The purpose is to obtain further data on virus infections occurring in Kansas.

PHENOL-CAMPHOR FOR "ATHLETE'S FOOT"

EDWARD FRANCIS, M.D., WASHINGTON, D. C.
Medical Director (Retired), U. S. Public Health Service

I have used a combination of phenol and camphor with success for curing "athlete's foot." This preparation may be compounded as follows:

Melt U. S. P. phenol and measure out 3 cc. into a mortar; weigh 3 Gm. of U. S. P. camphor, break into small pieces and add to the melted phenol. Rub until the entire mass is liquefied. Transfer into a vial with a stopper suitable for use as a dauber. Keep stoppered when not in use. Experiments indicate that the ingredients may be mixed in the proportion of 3 parts phenol and 1 part camphor.

The mixture is nonirritating to the skin and may be painted between the toes several times a day, the small rubber stopper of the vial being used as a dauber. The sock may be replaced immediately without danger of corrosion. There is no discoloration of the clothing. Relief from itching is immediate. It should be pointed out, however, that the phenol-camphor preparation should not be applied to the wet skin, since water causes a breakdown of the preparation, with the result that it becomes caustic.

A trade preparation of phenol, camphor and iodine in proportions which are not stated is the only preparation containing phenol and camphor that I have seen specifically advocated for "athlete's foot." Since, however, there is no statement as to the proportions of the phenol and camphor and since it also has the objection of containing iodine which would stain the skin and clothing, I believe that the simpler phenol-camphor formula is preferable.

It seems remarkable that, with the exception of the trade preparation mentioned, none of the authorities of whom I am aware and who have recommended phenol and camphor for various diseases have pointed out that it may also be useful for curing "athlete's foot."

Thus, for example, the Dispensatory[1] of the United States of America contains the following formula: phenol, 30 parts; camphor, 60 parts; alcohol, 10 parts. This is recommended for the local treatment of erysipelas. Andrews[2] recommends the same formula for barber's itch. Remington's Practice of Pharmacy[3] recommends this formula, but with substitution of liquid petrolatum for alcohol, as an antiseptic in dental practice. Swartz[4] recommends phenol and camphor, of each 1 ounce (28.35 Gm.), and iodine 1 drachm (4 Gm.) for tinea favosa and tinea capitis, but he does not mention that formula under epidermophytosis, "athlete's foot."

Twenty-Fifth and E streets N.W.

1. The Dispensatory of the United States of America, ed. 22, Philadelphia, J. B. Lippincott Company, 1937, p. 830.
2. Andrews, G. C.: Diseases of the Skin for Practitioners and Students, Philadelphia, W. B. Saunders Company, 1938, p. 336.
3. Cook, E. F., and LaWall, C. H., and others: Remington's Practice of Pharmacy, ed. 8, Philadelphia, J. B. Lippincott Company, 1936, p. 854.
4. Swartz, J. H.: M. Clin. North America **19**: 1627 (March) 1936.

Therapeutics

THE THERAPY OF THE COOK COUNTY HOSPITAL

UNDER EDITORIAL SUPERVISION OF DRS. LEROY H. SLOAN, MARSHALL DAVISON AND FREDERICK STEIGMANN

THE THERAPY OF MENINGITIS

ARCHIBALD L. HOYNE, M.D.
CHICAGO

PROPHYLAXIS

In the presence of an existing epidemic effective measures that will lessen the likelihood of an attack of meningococcic meningitis are the establishment of free ventilation and the avoidance of overcrowding. Close association with some one already infected is necessary in order to contract the disease, since the survival time of the isolated organism is short. It has been shown[1] that the carrier rate could be reduced in dormitories from 29 per cent to 5 per cent by increasing the space between the beds from 9 inches to 3 feet. Fatigue has been found repeatedly to be a contributing factor in the development of the disease. A well balanced diet is important in any scheme of preventive medicine. An absence or deficiency of all the requirements mentioned are presumed to contribute to the outbreaks of epidemic meningitis which usually develop in time of war or when large numbers of recruits are mobilized.

Known carriers of meningococci seldom contract the disease because of their own immunity. Nevertheless, they are the chief means of conveying the infection to others. For this reason carriers[2] as well as patients with active disease should be isolated. The minimum quarantine period for a patient suffering from the disease is usually about two weeks. With the advent of intensive chemotherapy with the sulfonamide derivatives, meningococci are not usually isolated from nasopharyngeal cultures following recovery from the acute attack. Carriers who have been treated with these drugs no longer harbor the organism.[3]

Vaccines have been used with doubtful success for the purpose of active immunization, but Ferry[4] has reported that a positive intracutaneous reaction caused by meningococcus toxin can be changed to negative in 66.8 per cent or more in those inoculated with three doses of the toxin.

Sometimes antimeningococcus serum or meningococcus antitoxin is administered intramuscularly for the purpose of passive immunization when there has been close contact with a person who has meningococcic meningitis. The real value of such treatment is questionable.

In all other forms of bacterial meningitis, with the exception of influenzal meningitis, some primary focus of infection is usually disclosed by a complete physical

1. Mutch, N.: Cerebrospinal Meningitis, Guy's Hosp. Gaz. London **54**: 282 (Oct. 5) 1940.
2. Silverthorne, Nelles; FitzGerald, J. G., and Fraser, D. T., with the technical assistance of Cameron, Colin: Studies on the Meningococcus and Meningococcus Infection, J. Pediat. **15**: 491 (Oct.) 1939.
3. Fairbrother, R. W.: Cerebrospinal Meningitis: Use of Sulfonamide Derivatives in Prophylaxis, Brit. M. J. **2**: 859 (Dec. 21) 1940.
4. Ferry, N. S., and Steele, A. H.: Active Immunization with Meningococcus Toxin, J. A. M. A. **104**: 983 (March 23) 1935.

examination. There are no special systemic procedures which can be adopted, with exception of those for tuberculous meningitis (Mantoux, patch test, roentgen ray) which occurs as the result of overcrowded and insanitary living conditions where a tuberculous person has been dwelling.

HISTORY OF THERAPEUSIS

Prior to the twentieth century all forms of bacterial meningitis were nearly 100 per cent fatal. The first real progress in therapy came with the introduction of lumbar puncture by Quincke in 1891 and the development in 1906 of antiserums by Kolle and Wassermann [5] and also by Jochmann [6] for the treatment of meningococcic meningitis. Soon afterward Flexner (1908) [7] announced an improved serum which was first used on an extensive scale during the Akron, Ohio, epidemic of meningitis in 1907. For the next twenty-five years antimeningococcus horse serums were used on account of their avowed antibacterial action, and rarely if ever did any one suggest that they possessed antitoxic properties.

INTRASPINAL TREATMENT

These standard antimeningococcus serums were administered intrathecally scarcely without exception until Herrick [8] in 1918 recommended large doses of antiserum intravenously when meningococcemia was apparent. Nevertheless, the intrathecal method was standard because of the contention that direct contact of the serum with the organisms in the spinal fluid was necessary to destroy the inciting cause of the disease. For this reason, if antimeningococcus serum was not injected intraspinally in the lumbar region it was likely to be given intracisternally or even intraventricularly. The mode of injection was nearly always by gravity after the withdrawal of spinal fluid in excess of the volume of serum that was to replace it.[9]

STANDARD ANTIMENINGOCOCCUS SERUMS

When meningococcic patients were treated with antiserum intrathecally the aim was to eradicate the organisms from the cerebrospinal fluid. To accomplish this purpose opinion differed regarding the frequency with which the serum should be given. Some prominent hospitals adopted a policy of administering antimeningococcus serum intraspinally "every six hours during the first few days," then every twelve hours and finally once in twenty-four hours. At Cook County Contagious Disease Hospital serum was never given more often than once in twenty-four hours. But, regardless of the intervals between intraspinal injections, this form of treatment was continued until laboratory reports specified that one or more cultures of the spinal fluid were negative. In addition, great weight was often attached to a high cell count, and sometimes for that reason alone serum treatment was continued even though no organisms could be demonstrated in the spinal fluid.

FATALITY RATES

There is no doubt that the production of a specific serum for the treatment of meningococcic meningitis exerted a decided influence on the mortality. As compared with preserum days, fatality rates were lowered 35 per cent or more. The statistics at Cook County Hospital show that for the nineteen year period [10] (1915-1933), the average fatality rate was 50.6 per cent (1,815 patients). Fatality rates [11] of 60 per cent or more were common. In 1929 the state of Missouri reported 65.3 per cent and in 1930 the Ministry of Health [12] in England announced an appalling figure of 95.1 per cent. During the Detroit epidemic of 1928-1931 inclusive, in which there were 1,686 cases, the fatality rate was 50.5 per cent. At that time the therapeutic results were considered remarkably good.[13] Chicago had an average fatality rate of 47.8 per cent for 4,028 cases of meningococcic meningitis in a twenty year period (1916-1935).[14] During those years there were some clinicians in Germany who advised against the use of antiserums for very young patients, claiming that better results could be secured merely by drainage. Moreover, there existed a general feeling that antimeningococcus serum was often lacking in efficiency.

REASONS OFFERED FOR FAILURE OF INTRASPINAL TREATMENT

Failure with the intrathecal treatment of meningococcic meningitis by antimeningococcus serum was often attributed to lack of agglutinating properties. But, practically, this conclusion was sometimes found to be erroneous because serums with little ability to agglutinate often gave good clinical results, whereas the reverse was not always true.

Besides the early standards of treatment which dictated that antiserum should be given intrathecally to patients with meningococcic meningitis, it has been felt quite generally that drainage of spinal fluid is always essential to avoid the "dangers" of intracranial pressure.

MENINGOCOCCUS ANTITOXIN

Until Ferry [15] reported a soluble toxin (1931) and developed meningococcus antitoxin (1932), little consideration was given to the toxemia of meningococcic meningitis. In November 1933, I made the first clinical trial of Ferry's meningococcus antitoxin at the Cook County Contagious Disease Hospital. In the beginning, the new serum was given intraspinally and also to a lesser extent intravenously,[16] according to a procedure followed sporadically since 1918.[17] As the value of the antitoxin became well established, the amount of intraspinal serum was reduced, while at the same time larger quantities well diluted in 10 per cent dextrose solution were given intravenously. By the end of about one year

5. Kolle, Wilhelm, and Wassermann, August: Versuche zur Gewinnung und Wertbestimmung eines Meningococcenserums, Deutsche med. Wchnschr. **32**: 609, 1906.

6. Jochmann, George: Versuche zur Serodiagnostik und Serotherapie der Epidemischen Genickstarre, Deutsche med. Wchnschr. **32**: 788, 1906.

7. Flexner, W.: An Analysis of Four Hundred Cases of Epidemic Meningitis Treated with the Antimeningitis Serum, J. Exper. Med. **10**: 690, 1908.

8. Herrick, W. W.: Meningococcus Infection, Including Cerebrospinal Fever, Oxford Medicine, 1932, vol. 5, part 1, p. 97.

9. Hoyne, A. L.: Epidemic Meningitis, Illinois M. J. **58**: 265 (Oct.) 1930.

10. Hoyne, A. L.: Meningococcic Meningitis: A New Form of Therapy, J. A. M. A. **104**: 980-983 (March 23) 1935.

11. Tripoli, C. J.: Bacterial Meningitis: A Comparative Study of Various Therapeutic Measures, J. A. M. A. **106**: 175 (Jan. 18) 1936.

12. Annual Report, Chief Medical Officer, Ministry of Health, London, 1933, p. 13.

13. Gordon, J. E.: Medical Report of the Herman Kiefer Hospital, Detroit, for the Five Years 1927-1931, sec. XXII.

14. Hoyne, A. L.: Meningitis, J. Iowa M. Soc. **26**: 549 (Oct.) 1936.

15. Ferry, N. S.; Norton, J. F., and Steele, A. H.: Studies of the Properties of Bouillon Filtrates of the Meningococcus; Production of a Soluble Toxin, J. Immunol. **21**: 293 (Oct.) 1931.

16. Hoyne, A. L.: Meningococcic Meningitis: Importance of Intravenous Therapy, Illinois M. J. **68**: 307 (Oct.) 1935.

17. Hoyne, A. L.; Arkin, H. S., and Sherman, M. J.: Treatment of a Severe Case of Epidemic Meningitis by Combined Intravenous and Intraspinal Injections of Antimeningococcus Serum, J. A. M. A. **72**: 22 (Jan. 4) 1919.

intraspinal therapy was discontinued [18] entirely and has not been used since 1935. In looking backward it seems interesting to recall that during a period of approximately thirty years, while continued efforts were being put forth to improve the effectiveness of antiserum, comparatively little attention was directed toward modes of administration other than the intrathecal route.

INTRAVENOUS THERAPY

When serum was administered exclusively by the intravenous [19] route, it was found not merely that fatality rates were sharply reduced but that complications were few and recoveries often took place within a week from the time that treatment was begun. Moreover, opisthotonos and loculations of spinal fluid due to arachnoidal adhesions were not so frequently encountered. In addition, the patient was not subjected to the discomfort, pain and possible injury [20] resulting from numerous lumbar punctures and the introduction of an irritating substance into the intrathecal sac.

With the success of exclusive intravenous therapy firmly established, it was soon proved that meningococci disappeared from the cerebrospinal fluid much quicker than when serum was injected intraspinally. Furthermore, it also became apparent that frequent lumbar punctures for the purpose of drainage are not required. The old fear concerning dangers of intracranial pressure was dispelled and the view that no permanent relief from intracranial pressure was derived by frequent lumbar punctures has now gained wider acceptance. In patients suspected of meningococcemia either with or without evidence of meningitis, if a positive blood culture is obtained no lumbar puncture is necessary, although for a general estimate of the severity and for purposes of completeness it is likely that for some time to come lumbar puncture will be performed. It is preferable that no puncture be made. We have treated successfully more than 40 such patients without any lumbar puncture.[21]

THERAPEUTIC POSSIBILITIES

Until the advent of the sulfonamides it was rare that a patient survived any attack of bacterial meningitis other than the meningococcic type. Today the situation is far different. If tuberculous meningitis is excluded, it is justifiable to state that a patient suffering from any form of bacterial meningitis has at least a chance for recovery. And with chemotherapy the technic of treatment has been greatly simplified in the management of meningococcic meningitis. Antiserum is no longer required for the majority of such patients. If, however, the patient is suffering from a severe attack, possibly of a fulminating character [22] with a profusion of petechiae or large hemorrhages of the skin, it is best to give at least one large dose (100,000 units) of Ferry's antitoxin or standard antimeningococcus serum (300 cc.) in about 600 cc. of 10 per cent dextrose in physiologic solution of sodium chloride (0.85 per cent) to which approximately 1 cc. of a 1 : 1,000 solution of epinephrine hydrochloride has been added. This mixture should be given slowly, starting with 10 to 15 drops a minute and at body temperature, by the drip method. If it seems advisable, this procedure may be repeated. As much as 150,000 units (450 cc.) of Ferry's antitoxin has been given in one dose according to the procedure described, and more than 2,000 cc. has been administered intravenously to a single patient without any serious reaction even though a horse serum was introduced. Tests to reveal sensitivity to horse serum should be performed before the antitoxin is given. If the patient is known to be sensitive to horse serum he should be desensitized before antitoxin is given intravenously. The technic of desensitization by injection of graduated doses of the product is well known. I have expressed the opinion that the diluted antitoxin given intravenously according to my method is no more likely to cause a serious reaction than the undiluted serum or antitoxin given intraspinally.

ROUTINE PROCEDURE

1. The history is taken and a physical examination, urinanalysis and blood count are made.

2. Blood is drawn for typing and culture.

3. Nose and throat swabs are taken for culture on Löffler's medium and blood agar plate.

4. A diagnostic puncture is made. If done, a Pandy test, a cell count and a direct smear, should be made, a blood agar plate should be inoculated and fluid should be sent to the laboratory for culture. Chemistry analyses should include one for total protein and for chlorides. A Wassermann test should be made and the pressure of the fluid should be noted.

5. Petechiae should be needled and a smear made of the exudate.

6. Therapy should then be started:

(*a*) Chemotherapy: The majority are given 5 Gm. intravenously of the appropriate sulfonamide and a blood level determination is made the following morning and chemotherapy continued orally.

(*b*) Ten per cent dextrose in physiologic solution of sodium chloride (0.85 per cent) 1,000 cc. is begun.

(*c*) A small blood transfusion, 250 cc., is given if the patient is in poor condition.

(*d*) If the patient requires more fluid, 5 per cent dextrose solution in physiologic solution of sodium chloride or dextrose-saline solution (2.5 per cent dextrose in 0.4 per cent saline) may be used.

These routines are not carried out implicitly as listed here. If the patient appears to have a meningococcic septicemia there is no need for spinal puncture, for the smear from the petechiae or blood culture will demonstrate the organism; chemotherapy is started, dehydration, acidosis and toxemia are being combated with dextrose and fluids; and by the time a reaction from these measures is expected the report of the blood culture will be known. If the response to therapy is poor and blood culture is positive, meningococcus antitoxin is given as outlined. If the blood culture is negative, then lumbar puncture is imperative for a diagnosis and should not be delayed. This procedure is not harmful to the patient, for if the meningitis is not of the meningococcic type the initial therapy is the same and lumbar puncture is merely diagnostic.

It must be remembered that after twelve hours of intensive chemotherapy spinal fluid cultures are often negative.

18. Hoyne, A. L.: Treatment of Meningococcic Meningitis Without Intraspinal Therapy, Nebraska M. J. **21**: 321 (Sept.) 1936.

19. Hoyne, A. L.: Intravenous Treatment of Meningococcic Meningitis with Meningococcus Antitoxin, J. A. M. A. **107**: 478-481 (Aug. 15) 1936.

20. Lyon, G. M.: Observations on the Treatment of Meningitis, West Virginia M. J. **28**: 193 (May) 1932. Pease, C. N.: Injuries to the Vertebrae and Intervertebral Disks Following Lumbar Puncture, Am. J. Dis. Child. **49**: 849-860 (April) 1935.

21. Hoyne, A. L.: Epidemic Meningitis, J. A. M. A. **115**: 1852-1855 (Nov. 30) 1940.

22. Hoyne, A. L.: The Treatment of Meningococcic Infections, Arch. Pediat. **53**: 164 (March) 1936.

CULTURES

Nose and throat cultures are taken on Löffler's medium for the purpose of noting the diphtheria organism. Blood agar plates are streaked to disclose hemolytic streptococci. The blood culture is made by placing 10 cc. of blood in 100 cc. of beef infusion broth. The spinal fluid used for culture is first centrifuged and about 1 cc. of the sediment is inoculated into a semisolid medium consisting of a 0.2 to 0.5 per cent agar in veal infusion broth with ascitic fluid and salt added. The organism recovered from growth then must ferment maltose and dextrose and be a gram-negative diplococcus.

CHEMOTHERAPY [23]

In any instance in which there is delay or doubt on the part of the laboratory in confirming or definitely establishing a bacteriologic diagnosis, it is generally advisable to begin treatment with sulfapyridine or sulfathiazole for the following reasons: They are effective in the treatment of meningococcic meningitis; they are the drugs of choice in pneumococcic meningitis; they are also capable of promoting recovery in cases of influenzal meningitis. In case the patient is comatose or possibly irrational, they may be administered intravenously as their respective sodium salts, and a proper blood level (6 to 8 mg. per hundred cubic centimeters) may be quickly established.

Patients with meningococcic meningitis may be treated throughout the course of their illness with sulfapyridine or sulfathiazole. If the patient is treated with sulfapyridine and can take the drug orally from the onset, it is customary to give an initial dose of 4 Gm. or less, depending on the severity of the disease, the weight and the age of the patient. This is then followed by 1 Gm. every four hours. For children a slightly smaller dose of the drug might be adequate, but close adherence to weight in measuring the dosage is not necessary. It is obligatory to keep a close check on the urine and, if there is evidence of blood, sulfapyridine should be stopped and sulfathiazole or sulfanilamide substituted. A similar change in medication should be instituted in case of nausea, vomiting or other evidence of toxicity which can be attributed to sulfapyridine. When these drugs are used it is mandatory that the patient have an adequate fluid intake.

These drugs may also be given rectally, as the sodium salts usually, in a perforated capsule or in a starch solution in the form of a retention enema. They also may be administered through a stomach tube.

If sulfanilamide is used it is usual to give one half the estimated total daily dose initially. This dose frequently ranges from 2 to 4 Gm. and is estimated on the basis of 0.06-0.12 Gm. per pound of body weight, depending on the severity of the disease. If the patient cannot take the drug by mouth, it may be given in 0.8 per cent solution subcutaneously. About 200 cc. of such solution may be given twice a day until oral administration is possible; then 1 Gm. every four hours usually suffices.

The Solutions Laboratory of the Cook County Hospital provides sodium sulfapyridine for intravenous use in 5 per cent solution of physiologic solution of sodium chloride instead of in distilled water, as usually advised. Flasks of 100 cc. will, therefore, contain about 5 Gm. of sodium sulfapyridine and are administered by the drip method. A blood level for sulfapyridine should be determined on the second day of treatment and should be repeated at least every other day in order to gage the required dosage of the drug properly. As soon as possible, sulfapyridine should be given by mouth instead of by vein. Generally we have aimed to keep the level at 8 mg. per hundred cubic centimeters or higher. This cannot always be done, though we have sometimes attained a level as high as 25 mg. per hundred cubic centimeters for a few days. However, there seem to be definite variations in the manner in which patients respond to sulfapyridine. In some instances in which blood levels were high the patients did not survive, whereas others recovered even though concentrations of the drug in the blood fell to as low as 3 to 4 mg. per hundred cubic centimeters. It is not necessary to make frequent lumbar punctures merely for the purpose of determining spinal fluid levels, which may be no more than 70 or even 50 per cent of the blood levels.

For appropriate purposes, sulfathiazole appears to be effective with lower blood levels than those usually required with the other sulfonamides. Blood levels of from 4 to 5 mg. per hundred cubic centimeters have seemed to be adequate. Rashes, conjunctivitis and erythema nodosum may develop during the course of treatment but are not common. Gastric distress or mental confusion does not occur.

If intravenous administration is necessary or seems advisable, sodium sulfathiazole can be injected. The manner and size of the dosage is similar to that of the related drugs. A 5 per cent solution of sodium sulfathiazole in physiologic solution of sodium chloride is also supplied by the laboratory although it has been claimed that no other solvent but distilled water should ever be used. Sulfathiazole should never be given in dextrose nor in blood for transfusions. It should always be administered from a clean vessel and through sterile tubing not recently used for any other purpose. It has been stated that sulfathiazole does not pass readily into the cerebrospinal fluid. On the basis of our limited experience we doubt the correctness of that opinion.

After the acute symptoms have come under control the "sulfa" drugs are continued at a reduced dosage. The patient is usually off all medication in eight days but to continue medication at reduced dosage lessens the possibility of relapse or of complications.

Sulfadiazine.[24]—This member of the sulfonamide group has been used for a great deal of clinical experimentation during the past year. It is claimed that sulfadiazine is less toxic than sulfapyridine or sulfathiazole and yet is as effective as either one of these drugs. Thus far sulfadiazine has not been obtainable for the treatment of meningitis in the Contagious Disease Department of Cook County Hospital. However, a report [25] of fourteen patients successfully treated with this drug has recently appeared. The use of this drug at present is in the experimental stage and should not be used as a routine until its place has been established.

MENINGITIS

Streptococcic Meningitis.—This responds well to sulfanilamide treatment. The procedures are the same as those described for meningococcic meningitis. Con-

23. With the rapid advance in chemotherapy, it is understood that the physician will appreciate the use of the "appropriate" sulfonamide and not allow his therapeutic technic to be harnessed to a single derivative.

24. Finland, Maxwell; Strauss, Elias, and Peterson, O. L.: Sulfadiazine: Therapeutic Evaluation and Toxic Effects on Four Hundred and Forty-Six Patients, J. A. M. A. **116**: 2641-2647 (June 14) 1941.

25. Dingle, J. H.; Thomas, Lewis, and Morton, A. R.: The Treatment of Meningococcic Meningitis and Meningococcemia with Sulfadiazine, J. A. M. A. **116**: 2666 (June 14) 1941.

trary to our experiences of years ago, we now anticipate that the patient with streptococcic meningitis will recover with proper treatment. Convalescent serum has been used as an adjunct to chemotherapy.

Pneumococcic Meningitis.—This was formerly almost as fatal as tuberculous meningitis. Within the past three years we have witnessed no less than 14 recoveries.[26] In one half this number specific type serum and also sulfanilamide or sulfapyridine were given. If serum is to be used, and generally such a decision is advisable, a culture from the spinal fluid is necessary and typing of the organism is required. The specific type rabbit serum in doses of from 200,000 to 400,000 units is administered intravenously. A total dose of more than 700,000 units has been given to a patient, and the same procedure is adopted as when a horse serum is being administrated intravenously. Lately several patients with pneumococcic meningitis have been treated successfully without the use of specific serum. Among the latter group was a 6 year old girl with type III infection. During her first hospital day she received 8 Gm. of sodium sulfapyridine intravenously and after that 1 Gm. of sulfathiazole by mouth every four hours. She had one lumbar puncture for the purpose of diagnosis. Recovery was complete in one week.

It seems quite likely that eventually it will be found that chemotherapy without serum is as effective in the treatment of pneumococcic meningitis as similar therapy is for meningococcic meningitis. The dosage of the sulfonamides for pneumococcic meningitis may follow the customary guides for the drug used. Nevertheless, it has seemed advisable to lean toward massive doses of the drug at the beginning of treatment and to reduce the size of the dose only in accordance with the progress made by the patient. I have had blood levels as high as 25 mg. per hundred cubic centimeters for patients who recovered when sulfapyridine was used. Moreover, in these instances there was comparatively little gastric disturbance and no abnormal urinary conditions.

Influenzal Meningitis.—This responds also to chemotherapy, and on the basis of my own experience there appears to be an element of doubt as to whether better results are obtained by the combined use of antiserum and one of the sulfonamides than by administration of the drug alone. However, the antiserums now available seem to be of value. Fothergill's anti-influenzal serum may be obtained from the Massachusetts State Board of Health. Alexander's Anti-Haemophilus Influenza Type B Serum (rabbit) is supplied commercially in 25 mg. vials. At least 50 to 100 mg. should be administered to a patient if this form of treatment is adopted in conjunction with chemotherapy. Although instructions accompanying the package recommend both intraspinal and intravenous injections, we have adhered to the exclusive intravenous route, employing the same technics as for other serums used in the treatment of meningitis. Alexander also advises daily lumbar punctures, a practice that we condemn. Usually our routine consists in large doses of sodium sulfapyridine intravenously after a lumbar puncture has permitted a laboratory diagnosis by examination of the spinal fluid. For the first two or three days it may seem advisable to give from 8 to 10 Gm. each twenty-four hours in 4 to 5 Gm. doses about twelve hours apart. Occasionally the temperature of a patient with influenzal meningitis will remain almost stationary on a high plane of approximately 104 F. even though large doses of sulfapyridine are being given to the patient. Under such circumstances it is well to substitute sulfathiazole. This change of drug is sometimes very effective. In fact there are some who believe that sulfathiazole is always the drug of choice for the treatment of influenzal meningitis. Others have reported favorable results with sulfanilamide.

Often blood transfusion will prove to be a valuable adjunct in the treatment of any form of meningitis; for influenzal meningitis this is particularly true. It is always well, therefore, to take the necessary steps to secure appropriate blood donors as soon as a diagnosis of influenzal meningitis has been established. We believe that drainage of the cerebrospinal fluid is no more a necessary part of the treatment of influenzal meningitis than for any other form of meningitis. Moreover, since we have seen more than 16 patients with influenzal meningitis recover who were treated in accordance with these principles of therapy, our optimistic attitude seems justified.

Staphylococcic Meningitis.—This is less frequently encountered than any other of the meningitides previously mentioned. Fatality rates are likely to be higher. Recently it was stated that the total number of reported recoveries was but 9. In the Cook County Contagious Hospital there have been 2 recoveries. One patient was treated with sulfanilamide and the other with sulfathiazole. Both received blood transfusions. One lumbar puncture was made on the sulfathiazole-treated patient. The blood level varied from 3 to 4 mg. per hundred cubic centimeters during most of the treatment. Although these levels seem low compared to the requirements for other sulfonamides, apparently they are adequate.

Generally, it is advisable to give as an initial dose from 3 to 4 Gm. intravenously and follow this by 1 Gm. of sodium sulfathiazole every four hours. It is usually felt that as few doses as possible should be given intravenously because of the danger of thrombosing vessels. It is also possible to cause sloughs if the solution of sulfathiazole enters the tissues.

NURSING CARE

Patients suffering from bacterial meningitis should be isolated. Proper disinfection and disposal should be made of the secretions from the nose and throat, the urine, blood and spinal fluid.

For their protection and that of others, the physician and the nurse should not contact a patient with meningitis unless they are in complete good health, are not unduly fatigued and have no infection of the upper respiratory tract. Any grossly contaminated article should not be touched with the bare hands. In their care of the patient all attendants should wear gowns. Careful attention should be paid to washing the hands and avoiding the spray from the nose and throat of the patient. Masks are proper equipment for attendants and nurses inexperienced in the care of contagious diseases.

The room should be kept quiet and preferably at a constant temperature, and the eyes of the patient should be protected from strong light. When a bath is given,

26. Rhoads, P. S.; Hoyne, A. L.; Levin, Benjamin; Horswell, R. G.; Reals, W. H., and Fox, W. W.: Treatment of Pneumococcic Meningitis, J. A. M. A. **115:** 917-922 (Sept. 14) 1940.

the water should be warm, and only a small area of the patient's body should be exposed at one time. The nurse must be unusually gentle in her handling of the patient.

Well padded side boards of beds or of cribs are used if necessary to protect the patient from injuring himself. If a nurse cannot be in constant attendance and side boards are insufficient, the opposite wrist and ankle are restrained by padded shackles.

Tepid sponges for reduction of temperature are given only as ordered by the physician and are rarely indicated.

It is the duty of the nurse to see that the patient maintains a normal intake of food and fluid but not to force either to the point of nausea. This is accomplished by giving frequent small feedings of any food desired and extra fluids between meals.

The nurse should observe and record accurately (*a*) symptoms of opisthotonos, rigidity of the neck, petechiae, nausea and vomiting, earache, headache, nasal discharge, disorders of the eyes or any unusual change, and (*b*) drugs given, noting the dosage and time taken, any emesis of medication with repetition of the dose or any untoward symptoms such as nausea or mental disturbance which may result. She should watch the intravenous administration to prevent the fluids from entering the subcutaneous tissues. If antitoxin is given, the solution should be warmed before and during administration. The nurse should watch carefully for signs of anaphylactic shock or serum sickness. It is, of course, her duty to assist the physician in the various procedures of drawing blood, making a lumbar puncture or giving intravenous therapy.

GENERAL RECOMMENDATIONS FOR THE TREATMENT OF BACTERIAL MENINGITIS WITH COMMENTS

1. A lumbar puncture should be made for diagnosis. This may not be necessary in early cases of meningococcemia.

2. No intraspinal therapy of any description should be given. As much harm as good may result from intrathecal treatment.

3. Frequent lumbar punctures for the purpose of drainage should be avoided. The old theory that intracranial pressure is permanently relieved by multiple withdrawals of cerebrospinal fluid is fallacious. The opposite effect is often produced.

4. When chemotherapy is resorted to maximum doses of the appropriate drug should be given at the beginning of the treatment, not at the end, at which time it is less effective.

5. If an animal serum is given intravenously, it should be well diluted in saline solution, not distilled water. If dextrose is chosen, the vehicle should still be saline solution, and epinephrine hydrochloride should always be added before the intravenous flow is started.

6. Opiates should not be administered to meningitis patients. Morphine may cause or increase existing edema of the brain. Comparatively few meningitis patients require sedatives.

The treatment of meningitis today need not be encumbered with the many difficulties which formerly attended it. Successful therapy depends now more on good judgment than on expert skill.

25 East Washington Street.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

TELEX HEARING AID, MODEL 900, ACCEPTABLE

Manufacturer: Telex Products Company, 1645 Hennepin Avenue, Minneapolis.

The Telex Hearing Aid, Model 900, is said by the manufacturer to be designed for slight cases of deafness. Its use is advocated for individuals whose hearing loss is under 50 decibels. In the Council examination the device was found to consist of one microphone and amplifier unit, disk shaped, 2½ inches in diameter by ¾ inch, weight 2.6 ounces; one crystal receiver, 1 inch diameter by ⅜ inch, weight 0.2 ounce (without earpiece); one 30 volt W-20 B battery; one 1.5 volt 2-ES A battery; A and B battery assembly in leather case, 4½ by 2½ by 1¼ inches, weighing 11.8 ounces.

Following are results of the Council's investigation:

BATTERY DRAIN

The A battery current shown was 65 milliamperes independent of volume setting and sound. The B battery current was independent of volume setting. With no sound, it showed a current of 0.9 milliamperes and with sound a current varying from 0.5 to 0.8 milliamperes, depending on the sound intensity.

INTERNAL NOISE

The internal noise was not excessive. With a well fitted earpiece, there was no feed-back when the volume control was set for full volume.

ACOUSTICAL GAIN

The figures given in the accompanying table are typical of the acoustical gains as shown by audiometric measurements.

Acoustical Gains

		512-2,049		
	128-256	Min.	Max.	4,096
At normal ear threshold set for full volume	nil	21	36	10 decibels

ARTICULATION

The usual articulation tests using hard of hearing subjects were made and showed satisfactory performance.

The Council voted to accept the Telex Hearing Aid, Model 900, for inclusion on its list of accepted devices.

ACOUSTICON, MODEL A-45, ACCEPTABLE

Manufacturer: Dictograph Sales Corporation, 580 Fifth Avenue, New York.

The Acousticon, Model A-45, was examined by the Council and was found to consist of the following items:

Microphone and Amplifier Unit, Model A-45, number 007647
A-battery Acousticon No. 26, 1.5 volts
B-battery Acousticon No. 41, 30 volts
B-battery Acousticon No. 39, 24 volts
B-battery Acousticon No. 37, 18 volts
B-battery Acousticon No. 35, 12 volts
1 crystal receiver
1 magnetic receiver
1 bone conduction receiver
1 leather battery case

Weights and dimensions of various parts are as follows:

	Dimensions	Weight	Current Drain, Milliamperes
Microphone and Amplifier Unit Ovoid Shape.....	2½" x 4" x 1"	4.7 Oz.	
A-battery, No. 26.....	1¼" Diam. x 2¼"	3.5 Oz.	60-70
B-battery, No. 41.....	2⅜" x 3" x 1"	5.8 Oz.	1.1 -2.2
B-battery, No. 39.....	2⅜" x 2½" x 1"	4.8 Oz.	1.0 -1.6
B-battery, No. 37.....	2⅜" x 1¾" x 1"	3.5 Oz.	0.5 -0.9
B-battery, No. 35.....	2⅜" x 1¼" x 1"	2.4 Oz.	0.25-0.4

Crystal receiver (without earpiece) 1 inch in diameter by 3/16 inch
Magnetic receiver (without ear mold) ⅞ inch in diameter by ½ inch
Weight 0.35 ounce
Bone conduction receiver, weight 0.64 ounce

The A and B batteries are assembled by means of a spring clip connector and carried in the leather case.

The manufacturer recommends B-batteries as follows:

With bone conduction receiver.....24 and 30 volts
With magnetic receiver.....18 and 24 volts
With crystal receiver.....12 and 18 volts

With these combinations and a carefully fitted ear mold, the instrument could be turned up to full volume without feedback squeals. However, the 18 volt battery with the crystal receiver requires very careful fitting of the ear mold to meet this test. Noise due to rubbing or impact on the microphone case was rather high with the crystal receiver.

Acousticon, Model A-45

ACOUSTICAL GAIN

The following figures give the order of magnitude of the increase in sound intensity levels at the ear of the subject over those at the microphone under conditions of actual use as shown by audiometric measurements. They are not the same as the electrical amplification shown by measurements of electrical input and output.

Receiver	B Voltage	Volume	128	256-2,048	4,096 Cycles
Crystal	18	Full on	Nil	20 to 48	10 decibels
Magnetic	18	Full on	Nil	6 to 32	12 decibels

ARTICULATION

Syllable and sentence lists were used with hard of hearing subjects at a distance of 5 feet in a quiet room, using various combinations, with volume set for comfortable loudness. Satisfactory results were shown with crystal and magnetic receivers and with the bone conduction receiver.

The Council voted to accept the Acousticon, Model A-45, for inclusion on its list of accepted devices.

ALADDIN HEARING AID, MODEL NO. 7, ACCEPTABLE

Manufacturer: National Electronics, Inc., Schenectady, N. Y.

Distributor: Electronic Sales Company, 74 Chapel Street, Albany, N. Y.

The Aladdin Hearing Aid is a wearable vacuum tube instrument. The firm states that the unique feature of the device is the manner in which the amplifier and all the batteries are combined in a single assembly called the "Unipak."

In the Council examination the device was found to consist of the following items:

One battery and amplifier unit.
One microphone.
One crystal receiver, 1 inch in diameter.
One midget crystal receiver, ¾ inch in diameter.

The A and B batteries and the amplifier are incorporated in a single unit in a leather covered metal case. This unit measures 5½ inches by 3 inches by 1¼ inches and weighs 436 Gm. (15.4 ounces). Volume control is effected by a single knob on the top of the unit. The microphone is a flat disk 1¾ inches in diameter, ⅜ inch thick, weighing 26 Gm. (0.92 ounce). Connectors are of the prong in hold type and well made.

Aladdin Hearing Aid
Model No. 7

The A battery is a 1½ volt battery 1-ES. The B battery is an Aladdin No. EP-424, 27½ volts.

Following are results of the Council's investigation:

Current Drain.—The A battery drain with control set for full volume was found to be 65-70 milliamperes. The B battery showed a current of 1.2 milliamperes.

Internal Noise.—The internal noise level was not excessive and the instrument was comparatively free from noise due to shock. There was very slight tendency to "feed back" squeals.

Acoustical Gain.—The following are typical of the increase in sound intensity levels at the ear of the subject with molded earpiece over that at the microphone as shown by audiometric measurements.

With Intensity at Microphone Approximately 40 Decibels Above Normal Ear Threshold

Measurements with a hard of hearing subject were uncertain because of inductive pickup of the audiometer signal, but they indicated that the gain was not materially less than those shown above.

With Normal Ear Threshold Intensity at Microphone

Vol. Setting	Receiver	Gain 128-256	512-2,048	4,096
Full on	1 inch receiver Fitted earpiece.....	None	11-30	10 decibels
Full on	¾ inch receiver....	None	11-29	4 decibels

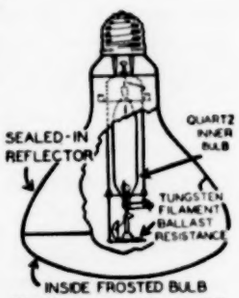
Articulation.—Syllable and sentence tests with hard of hearing subjects showed satisfactory performance.

The Council voted to accept the Aladdin Hearing Aid for inclusion on its list of accepted devices.

WESTINGHOUSE MAZDA RS SUNLAMP ACCEPTABLE

Manufacturer: Westinghouse Electric & Manufacturing Company, Lamp Division, Bloomfield, N. J.

The Westinghouse Mazda RS Sunlamp is described by the firm as a self-ballasting mercury vapor lamp equipped with its own built-in reflector. The reflecting surface, being deposited on the inside of the R-40 bulb, is protected from corrosion and dust; this fact, according to the firm, provides for a high maintenance of the output throughout the life of the lamp. The internal ballast consists of a tungsten filament resistance which operates at incandescence and radiates infra-red to provide comfortable warmth in the beam.



Westinghouse Mazda RS Sunlamp.

Following are data submitted by the firm:

Essential Technical Data

Watts	275 (combined mercury vapor arc and ballast)
Volts	110-125 (50-60 cycle A. C.)
Outer bulb designation	R-40
Material	Ultraviolet transmitting glass
Finish	Light inside frost-reflecting neck
Inner bulb	Quartz
Base	Medium screw
Maximum overall length	6⅞ inches
Burning position	Any
Life	400 application
Erythemal time	Approximately 5 minutes at 24 inches
Beam characteristics	40° divergence to 30% of axial intensity

The spectral energy distribution in the ultraviolet region produced by this lamp is as follows:

Manufacturer's Results		Council's Results	
Wavelength, Angstroms	Microwatts per CM² at 30 Inches	Microwatts per CM² at 24 Inches	
		Lamp No. #3	#10
3,129	215.0		
3,022	76.0	150	214
2,967	28.0	76	98
2,925	3.2	47	50
2,894	4.7		
2,804	1.4	Too low to measure	
2,753	0.1		
Total	228.4 uW/cm²	273	362 uW/cm²

This total radiation output equals two to three times minimum requirements of the Council on Physical Therapy.

Fluoroscopic examination of the lamp by the Council confirmed the manufacturer's observations showing that the ultraviolet radiation of wavelengths shorter than 2,800 A is absent. Spectral measurements showed that in spectral quality and total intensity these lamps comply with the Council's requirements for acceptance as a "sunlamp."

The Council voted to accept the Westinghouse Mazda RS Sunlamp for inclusion on its list of accepted devices.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 NORTH DEARBORN STREET - - - CHICAGO, ILL.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - Eight dollars per annum in advance

Please send in promptly notice of change of address, giving both old and new; always state whether the change is temporary or permanent. Such notice should mention all journals received from this office. Important information regarding contributions will be found on second advertising page following reading matter.

SATURDAY, DECEMBER 6, 1941

PHYSIOLOGIC ANATOMY OF POLIOMYELITIS

When a ventral horn cell of the spinal cord is destroyed by the virus of poliomyelitis, all muscle fibers normally innervated by the affected neuron degenerate and ultimately disappear. It is not widely appreciated that muscles responsible for locomotor movements are made up of clusters of skeletal muscle fibers which receive innervation from single anterior horn cells. The ultimate physiologic unit of the reflex, therefore, is not the single muscle fiber but rather the group of muscle fibers controlled by one ventral horn cell; to designate such groups, Eccles and Sherrington [1] have introduced the convenient term "motor unit." They have found, after causing all sensory fibers from a given muscle to degenerate, that the motor nerve fibers to a skeletal muscle can be counted, and it was incidentally disclosed that the nerve supplying such a muscle actually contained more fibers near the muscle than at more proximal points. From this they concluded that individual axons must divide as they approach the muscle. Through teasing the nerve trunk as it ramifies in the muscle mass they confirmed this deduction, and they were able to demonstrate the existence of widespread bifurcation of the individual axons within the muscle substance.

Dean Clark,[2] in a paper which is now a classic in neuromuscular physiology, disclosed that individual nerve fibers passing to soleus and gastrocnemius muscles of cats supply an average of one to two hundred skeletal muscle fibers. After causing degeneration of all sensory fibers, Clark enumerated the remaining motor nerve fibers, and he also counted the number of muscle fibers in the muscle in question. For the soleus he obtained an innervation ratio of 1 to 120 and for the extensor longis digitorum 1 to 165. Similar innervation ratios are known to exist in man from the early studies of Tergast,[3] who, however, failed to make allowance in his calculations for sensory nerve fibers. It follows from this that, when one anterior horn cell succumbs to the virus, not less than one hundred muscle fibers undergo atrophy and die. From embryologic study one knows that the emergent nerve fibers from the spinal cord attach themselves to a closely knit group of muscle fibers. The Swedish pathologist Gunnar Wohlfart has observed in poliomyelitis [4] and amyotrophic lateral sclerosis [5] that degeneration of muscle fibers follows a pattern, not of muscle fibers, but rather of discrete muscle fasciculi. In examining sections of atrophic poliomyelitis muscles one frequently finds complete atrophy of all striated muscle fibers in a given fasciculus, while in the next fasciculus the majority of fibers appear healthy and intact. It is possible, therefore, that the muscle fasciculus may in many instances represent the motor unit. Sometimes, however, only half or a third of a fasciculus is affected, but in these instances the degenerating fibers are closely grouped and are not scattered indiscriminately through the fasciculus.

Denny-Brown, who has recently come to this country as professor of neurology at Harvard, points out in a recent paper with Pennybacker [6] that in certain irritative neuromuscular diseases individual muscle fibers are affected in such a way as to give rise to fine twitching along the muscular surface. This is true "fibrillation" and results from abnormal irritability of individual muscle fibers; "fasciculation," on the other hand, involves large groups of fibers which tend to respond simultaneously and involuntarily. Fibrillation arises from disordered metabolism of the individual muscle fiber, fasciculation from irritative disorders of the ventral horn cell or its axons (e. g. in amyotrophic lateral sclerosis [5]).

In considering the physiologic anatomy of poliomyelitis and the therapeutic measures designed to benefit patients with poliomyelitis, it is thus highly important to visualize the motor unit; for it is the unit as a whole, rather than the individual fiber, that degenerates. Some units are larger and some small, and it is probable that the larger ventral horn cells control the larger units (Sherrington). Similarly some muscle fasciculi are large and some small, but one cannot yet generalize concerning the precise relation of the motor unit to the muscle fasciculi.

1. Eccles, J. C., and Sherrington, C. S.: Numbers and Contraction Values of Individual Motor Units Examined in Some Muscles of the Limb, Proc. Roy. Soc., s. B, London **106**: 326 (June 2) 1930.
2. Clark, D. A.: Muscle Counts of Motor Units: A Study in Innervation Ratios, Am. J. Physiol. **96**: 296 (Feb.) 1931.
3. Tergast, P.: Ueber das Verhältniss von Nerve und Muskel, Arch. mikr. Anat. **9**: 36, 1873.
4. Wohlfart, Gunnar: Ueber das Vorkommen verschiedener Arten von Muskelfasen in der Skelettmuskulatur das menschen und einiger Säugetiere, Acta psychiat. et neurol., 1937, supp. 12, p. 1.
5. Wohlfart, Gunnar, and Swank, R. L.: Pathology of Amyotrophic Lateral Sclerosis: Fiber Analysis of the Ventral Roots and Pyramidal Tracts of the Spinal Cord, Arch. Neurol. & Psychiat. **46**: 783 (Nov.) 1941.
6. Denny-Brown, D. E., and Pennybacker, J. B.: Fibrillation and Fasciculation in Voluntary Muscle, Brain **61**: 311 (Sept.) 1938.

These physiologic and anatomic considerations have a direct bearing on the therapeutic measures and practices recommended for the treatment of poliomyelitis. At one time it was believed that in early cases of poliomyelitis complete immobilization should be done as far as the affected muscles were concerned. Several years ago Sister Kenny in Australia recommended that free movement should be allowed and that affected muscles should be accorded the benefit of massage and passive movement instead of immobilization. It should be pointed out in this connection that there is no experimental evidence to support the contention that single muscle units might, as a result of appropriate manipulation, be encouraged to send their nerve fibers to muscle fibers which had been rendered atrophic by anterior horn cell degeneration. Normal units, however, become atrophic under conditions of immobilization, since muscle fibers are dependent for normal stimulation on their local reflexes (e.g., stretch reflexes) and immobilization arrests the flow of these proprioceptive impulses as effectively as it abolishes the flow of lymph. Massage and freedom of movement, therefore, are clearly indicated if all available motor units in paretic muscles are to retain their maximum physiologic capacity.

THE FOURTH ANNUAL CONGRESS ON INDUSTRIAL HEALTH

Because industrial health is a necessity in defense production, the problems of maintenance of health in industry continue to grow in importance and extent. Many physicians are beginning to express interest in industrial appointments not only as a direct contribution to preparedness but because they sense values in industrial health which provide opportunity for interesting and beneficial professional careers. The program of the fourth annual Congress on Industrial Health, which is published in the Organization Section of this issue of THE JOURNAL, is designed to intensify this interest and to attract the attention of the profession as a whole to those aspects of industrial practice for which medical leadership and initiative are required. Industrial physicians cannot shoulder the responsibility alone; it is equally the concern of physicians in private general practice and in the specialties.

The training of physicians for satisfactory medical service in industry still is encountering obstacles through lack of information about what needs to be taught and available sources for obtaining teaching personnel and clinical facilities. Discussions of undergraduate and postgraduate industrial medical teaching will therefore occupy a prominent place in the program. Present plans for training and placement need integration with the program of the newly organized machinery for assignment of medical personnel in industry, details of which will be presented by a representative of the Procurement and Assignment Service. Conservation of manpower is a primary industrial objective in war time, and plans which have been developed jointly by industry and a state medical association will be presented. Since it is illogical to train candidates for exacting skills who are unfitted physically or temperamentally for such work, job placement in industry is of exceptional current interest. The practical aspects of this important phase of medical service will be presented from the governmental, industrial and teaching points of view.

Special reports will be available for presentation during this congress. A joint statement prepared by the Council on Foods and Nutrition and the Council on Industrial Health evaluating vitamin rationing in industry will be presented. Dermatoses continue to occupy first place in claims for occupational disease compensation. A committee representing the Section on Dermatology and Syphilology will submit a report in which definitions of industrial dermatoses and primary skin irritants will be discussed, as well as the criteria for diagnosis of cutaneous afflictions of occupational origin. In a similar manner the Committee on Industrial Ophthalmology of the Section on Ophthalmology is preparing a preliminary statement about the bases for dependable appraisal of vision in industry and the related problems of correction. Lectures on important topics under the general heading of industrial medicine and traumatic surgery will be introduced as a powerful impetus toward improved standards of medical service in industry. These lectures will be a regular feature of all subsequent congresses.

Other important subjects for discussion include the question of medical service to small industry, with particular reference to free choice of physician for specific services, and the evaluation of technics and equipment for mass chest surveys, which are being applied more and more to supplement industrial physical examination programs. Special events include field trips to industrial medical departments for physicians interested in details of practical administration. A clinical program has been arranged in conjunction with the faculty of the University of Illinois College of Medicine.

This program illustrates once again that it is difficult to discover a field in either the basic or clinical medical sciences which has not contributed to or been affected by health problems in industry. The Council anticipates that each succeeding congress will reemphasize this important relationship.

Current Comment

ADDITIONAL APPROPRIATIONS ASKED FOR CONSTRUCTION OF HOSPITALS

On November 28 Representative Lanham of Texas, author of the original measure passed by Congress in June 1941 authorizing the expenditure of $150,000,000 for community facilities in defense area communities, introduced a bill to increase this amount by another $150,000,000. Washington reporters say that the bill will receive speedy passage by Congress. On December 1 there were on file with the Federal Works Agency in Washington over three thousand applications for federal funds, totaling nearly $800,000,000, for the construction of schools, sewerage systems, hospitals and other community facilities authorized under the Lanham act. Over five hundred of these applications were for hospitals, health clinics and health centers, calling for the expenditure of $140,000,000 in federal funds, which if approved would have left only $10,000,000 for the numerous other community facilities provided for under the act. The Federal Works Agency has already approved one hundred and twenty-six of the hospital, health center and health clinic projects, which involve about $21,000,000 in federal funds. Presidential approval, also necessary under the act before funds can be expended, has not been received for all of these. As of December 1, eighty of the one hundred and twenty-six applications had received presidential approval, with about $12,000,000 in federal funds allocated to them. Officials of the Federal Works Agency state the $150,000,000 appropriated under the original act is about exhausted, and possibly funds from the new bill will be necessary to take care of some of the forty-six projects already approved by FWA and now awaiting presidential signature.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

Elsewhere in this issue appears a new department of THE JOURNAL entitled "Procurement and Assignment Service for Physicians, Dentists and Veterinarians." Since this is the first time this department has appeared, the record covering the inception and establishment of this bureau is provided in detail, together with a complete list of the various committees which are to function in an advisory capacity to the board that directs the service. Major Sam F. Seeley has been detached from the United States Army Medical Department to serve as executive director in a full time capacity. A regional office has already been established in the headquarters of the American Medical Association to utilize the roster of physicians prepared by the American Medical Association. Similar rosters are in process of development in the headquarters of the American Dental Association and the American Veterinary Medical Association, which also are located in Chicago. The Committee on Medical Preparedness of the American Medical Association has been called for a special session to take place in the near future, at which time means will be developed for cooperation of this committee in the various corps areas and of the state and county committees on medical preparedness with the Procurement and Assignment Service. Liaison officers have been appointed representing each one of the government services which utilize physicians and which will in the future procure its personnel through the Procurement and Assignment Service as far as possible. The technic proposed is experimental. There seems to be every indication, however, that it can function successfully. The complete cooperation of the medical profession of the country with this service will, of course, do much to aid its efficiency. In times like these, with the tremendous demands now being made on the medical profession, the desirability of attempting to assign every physician to the special function for which he is best suited and the necessity of utilizing every capacity of every physican to the utmost in the continuance of his civilian practice, in medical teaching, in industrial medicine, in the Army, Navy and Public Health Service or in any number of the many ways in which physicians now serve, cannot be questioned.

OVINE VENEREAL ULTRAVIRUS

A venereal infection of sheep due to an ultravirus has been described by Tunnicliff and Matisheck [1] of the Veterinary Research Laboratory, Montana State College. Venereal infections of sheep have been prevalent in certain areas of the United States for more than thirty years. One disease is popularly known as "pizzle rot," "foul sheath" or "venereal form of lip and leg ulceration." The infection is characterized by ulceration and scab formation, the lesions being most common at the preputial orifice or on the lips of the vulva. In the male the penis may be involved, severe balanitis usually resulting in phimosis or paraphimosis. The balanoposthitis is usually regarded by veterinarians as one of the many gangrenous conditions of domestic animals produced by Actinomyces necrophorus. In eleven infected ewes and rams recently examined in the Montana State Laboratory, necrophorus bacteria were not found. In aerobic and anaerobic cultures bacteria were not noted constantly present in all lesions, with the exception of a small gram-negative bacillus, which proved to be noninfective if swabbed into the scarified venereal surfaces of normal sheep. Experimental transmission, however, was readily accomplished by similar application of bacteria-free filtrates of diseased tissues. Typical lesions were produced by these filtrates, and the disease again transmitted by filtrates from the filtrate-produced cases. The size, antigenicity and chemotherapy of the ultravirus presumably present in these filtrates and its pathogenicity for other animal species have not yet been reported by the Montana investigators. Evidently, however, they have discovered promising material for basic virus research, with numerous suggestive clinical applications.

1. Tunnicliff, E. A., and Matisheck, P. H.: Paper 155, Agricultural Experimental Station, Montana State College, Science **94**: 283 (Sept. 19) 1941.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

The Procurement and Assignment Service was approved by the President on October 30. The creation of this service resulted from a recommendation of the Subcommittee on Medical Education of the Health and Medical Committee to the Health and Medical Committee on March 31. Following a meeting of the Health and Medical Committee on April 28, this recommendation was transmitted by the Health and Medical Committee to the Committee on Medical Preparedness of the American Medical Association for its consideration. The Committee on Medical Preparedness presented this recommendation to the House of Delegates of the American Medical Association at its meeting in Cleveland, June 2 to 5. At this meeting the House of Delegates adopted the following resolution:

WHEREAS, The President of the United States has declared that we are in a state of unlimited emergency, and the Surgeon General of the United States Army requested the American Medical Association in June 1940 at the annual session to aid in the procurement of the necessary personnel for an army of 1,500,000 men; and

WHEREAS, The American Medical Association established a Committee on Medical Preparedness which has now on hand the records of approximately 150,000 physicians as well as a statement as to their training, experience and specialization; and

WHEREAS, The sudden entrance of the United States into a war might immediately require the services not only of the physicians already called to duty but of a very considerable additional number; and

WHEREAS, Neither the American Medical Association nor any other civilian agency has the responsibility or the authority for the selection of those physicians who would be necessary for immediate duty and who would be called for civilian practice into service with the military agencies; therefore be it

Resolved, That the United States government be urged to plan and arrange immediately for the establishment of a central authority with representatives of the civilian medical profession to be known as the Procurement and Assignment Agency for physicians for the Army, Navy and Public Health Service and for the civilian and industrial needs of the nation.

This recommendation is made to avoid or minimize confusion and the inevitable delay which would result from the lack of such an arrangement. It is further recommended by the Committee on Medical Preparedness that, if this resolution is approved by the House of Delegates, a copy of it be sent to the President of the United States, the Secretary of War, the Secretary of the Navy, the Chairman of the Senate and House Committees on Military Affairs, the Administrator of the Federal Security Agency, the Surgeon General of the United States Army, the Surgeon General of the United States Navy, the Surgeon General of the United States Public Health Service, the Adjutant General of the Army, and the Health and Medical Committee.

The Health and Medical Committee voted to adopt these recommendations in principle and forward them to the Coordinator, with the suggestion that he consult with the Secretary of War and the Secretary of the Navy and that matters concerning details of organization remain contingent on the action taken by those officials.

Mr. McNutt has held preliminary discussion with the appropriate people in Washington and has asked that the Health and Medical Committee proceed with the drafting of the legislation necessary for translating the objectives of the resolution into effective action.

This resolution was presented to the Health and Medical Committee at its meeting on July 2, 1941. The committee reviewed the resolution and voted to adopt it in principle and forward it to the Coordinator with the suggestion that he consult with the Secretary of War and the Secretary of Navy and that all matters concerning details of organization remain contingent on action taken by those officials. In August the Committee on Medical Preparedness of the American Medical Association met in Washington with representatives of various governmental agencies to consider the proposal.

This resulted in a meeting of the Health and Medical Committee on October 22 to initiate the development of a Procurement and Assignment Service. At that meeting the following were present:

Health and Medical Committee.—Dr. Irvin Abell, Chairman; Surgeon General James C. Magee, U. S. Army; Admiral Ross T. McIntire, U. S. Navy; Surgeon General Thomas Parran, U. S. Public Health Service; Dr. Alfred N. Richards, Office of Scientific Research and Development; Dr. James A. Crabtree, Executive Secretary.

Liaison Officer.—Major Sam F. Seeley, M. C., U. S. Army.

Administrator and Staff.—Mr. Paul V. McNutt, Administrator; Mr. Watson B. Miller, Assistant Administrator; Mr. Leonard J. Calhoun, Assistant General Counsel; Mr. Perrin H. Lowrey, Office of General Counsel.

Consultants.—Dr. George Baehr, Office of Civilian Defense; Col. Leonard G. Rowntree, Selective Service; Dr. Frank H. Lahey, American Medical Association; Dr. Olin West, American Medical Association; Dr. Morris Fishbein, American Medical Association; Dr. Rosco G. Leland, American Medical Association; Dr. Fred W. Rankin, American Medical Association; Dr. Harvey B. Stone, American Medical Association; Dr. C. Willard Camalier, Subcommittee on Dentistry; Dr. Gerald T. Timmons, American Dental Association; Dr. C. Sidney Burwell, Subcommittee on Medical Education; Dr. Nathaniel W. Faxon, Subcommittee on Hospitals; Col. George F. Lull, M. C., U. S. Army; Dr. Hugo Mella, Veterans Administration; Dr. Verne K. Harvey, Civil Service Commission; Mr. George St. J. Perrott, National Institute of Health.

At this meeting, the Health and Medical Committee named a Commission to Draft a Program for a Procurement and Assignment Service, the members being Dr. Frank H. Lahey (Chairman), Dr. C. Sidney Burwell, Dr. Harvey B. Stone, Dr. Clarence D. Selby, Dr. Morris Fishbein and Dr. C. Willard Camalier.

At a meeting of the commission on October 28 the following report was made:

When the 1918 armistice was signed, the United States Army had 3,673,888 men in service and 31,501 Medical Corps officers. Should the United States Army be expanded for any reason in the near future to any similar size, at least an equivalent number of physicians would be required.

Today the United States Army includes approximately 90,000 officers, 6,000 nurses and 1,480,000 enlisted men. Of the 90,000 officers approximately 14,000 are in the medical department and of the soldiers approximately 109,000 are in the medical department. The officers in the medical department include 11,465 physicians in the Medical Corps, of whom 8,983 are reserve officers, 1,250 regular officers and 1,232 National Guard officers. Calculated on a basis of six medical officers per thousand men there is at present a shortage of about 1,473 medical officers. The Army Medical Department also includes 2,300 dentists in the Dental Corps and 660 veterinarians in the Veterinary Corps.

Should the Army not be greatly expanded within the next year but continue with a training program of about the present scope, a maximum of approximately 3,200 replacements would be required each year for the next five years during the period of the Selective Service Act. It is estimated that approximately two-thirds of the physicians now in service would elect to remain for the period of the emergency. If, however, it should not be possible to retain these men in service, the number needed for replacement would be considerably expanded.

The Army has a Medical Reserve Corps which includes some physicians who can be called for various types of military service. In calling

men to service it is customary to call them from the Reserve Corps. Moreover, there are now organized a considerable number of sponsored units including general hospitals, field hospitals and smaller units. Today the so-called sponsored units include sixty-eight general hospitals, thirty evacuation hospitals and twenty-five surgical hospitals. These units are not yet an active part of the military establishment and the physicians associated with such units, if they are members of the Reserve Corps, may be called into service at any time. Then if these units are ordered into service, those physicians who are affiliated may be detached from the service to which they are assigned and returned to the sponsored unit.

THE NAVY

The needs of the United States Navy have been satisfied by a considerable expansion of the regular Navy Medical Service. The Navy demands about 6.5 physicians for every thousand of its personnel. At present enough physicians are enrolled to meet its needs, so that a new increment of approximately 100 physicians is required now as replacements. It seems likely that by July 1942 with the expansion of the Navy another 700 physicians would be required. To meet this need the Navy has a pool of 1,000 in its Reserve Corps.

The Navy also requires from 12 to 15 dentists each year. There are now 650 dentists on active duty, of whom 300 are dental reserves. The Navy has, moreover, approximately 1,500 dentists on reserve status.

THE PUBLIC HEALTH SERVICE

The United States Public Health Service requires about 35 new officers each year to meet its normal requirements for replacements. However, in view of the present expanded activities, the next year would require approximately 100 interns in public health service institutions. It also requires about 10 dentists each year in the form of new assignments and for replacements. At present the Public Health Service is recruiting physicians for defense areas, for service in extracantonment zones and for defense industries. Moreover, state health departments to meet new expansions require about 150 additional physicians.

The United States Public Health Service also maintains a reserve. Most of its men, however, are active in various state or local health positions. The removal of these men from such positions would, of course, require replacement.

THE UNITED STATES VETERANS BUREAU

The United States Veterans Bureau now has about 1,800 physicians in full time positions. About 500 of the physicians in the Veterans Bureau hold positions in the United States Army Medical Reserve Corps, as do also a considerable number of men in the field of public health either with local or with state organizations. In order to bring the Medical Reserve Corps of the Army into a position in which it could be counted as an active asset, all men holding reserve positions who are otherwise occupied in essential functions should resign their commissions from the United States Army Medical Reserve Corps.

THE CIVIL SERVICE COMMISSION

The Civil Service Commission provides many federal agencies with lists of physicians to meet their needs. Such agencies as the Indian Service, the Bureau of Mines, the Coast Guard Service, the Department of Pensions and many other groups employ physicians from the Civil Service lists. Altogether such agencies employ about 2,500 doctors. Each year they employ about 400 new men for replacements or for new positions. For the present fiscal year they lack 250 physicians to meet their requirements.

An evaluation of the total number of physicians immediately required to meet various governmental needs during the next year would indicate between 2,000 and 3,000 unless there should be a sudden expansion of the United States Army.

PRESENT CONDITIONS

At present even the United States Army Medical Department may have difficulty in securing physicians for its needs.

When the Selective Service age was changed from 35 to 28 the possibility of securing any considerable number of medical men by Selective Service was so greatly diminished as almost to eliminate the Selective Service as a source for securing physicians. The average age of graduation from medical school today is approximately 28 years. Following graduation the young physician must have an internship of at least one year in a recognized hospital. Many of the civilian hospitals of the country are already short of the number of interns that they require to carry on their service efficiently. Many of the large hospitals which employ considerable numbers of interns have established economy in the number of interns by reducing the number by one third to one half.

The medical schools of the United States graduate each year approximately 5,000 physicians. The number of physicians graduated is just about what is needed to supply the hospitals capable of extending the education of the young physician by an internship with the interns that they require. Many smaller hospitals having less than one hundred beds, which is the limit placed on an acceptable internship by the Council on Medical Education and Hospitals of the American Medical Association, find it difficult if not impossible to secure interns at this time. Indeed, such hospitals have become accustomed to paying fairly good salaries to young men, who then take a second or third year of training in the smaller hospitals. By the time the physician has completed his internship he is in many instances married. The estimates would indicate from one fourth to one half of the total number as being with dependents by the time they have finished the intern period. Moreover, among physicians, as among the public generally, in view of the high physical standards maintained by the United States Army and Navy, slightly over one half of the young physicians are able to qualify physically for commissions in the Army or Navy Medical Corps. Indeed, it has been suggested that a different standard be maintained for physicians particularly as relates to minor defects of vision which are correctible with eyeglasses or to some similar defect in order to enable such physicians to be commissioned in the Medical Corps. In many instances these men would be quite capable of giving good medical service without the likelihood that they would eventually become a dependent of the government.

In addition to the demands made on the medical profession by the services already mentioned, there is the necessity for some service related to civilian defense, to the Selective Service and to expanded war industries. Thus many of the large construction projects of both the Army and the Navy demand physicians who are being employed as contract physicians and surgeons for the period of the construction.

Moreover, in order to provide for a continuous supply of men with specialized training, approximately 800 to 1,000 of the young men who have completed one or two years of internship must take an additional three to five years of residency or specialistic training to qualify before the various boards which examine and certify men in the specialties.

SUMMARY

The coordination of the various demands made on the medical, dental and veterinary personnel with the available supply and the most efficient utilization of this professional personnel would seem to demand the establishment of a special agency capable of recording the qualified personnel available, of assigning such personnel or encouraging voluntary enlistment of such personnel in the services where most needed and of giving every qualified physician, dentist and veterinarian an opportunity to enroll himself in some service demanded by the national need.

CONCLUSION

For this reason a special committee, appointed by the Health and Medical Committee of the Office of Defense Health and Welfare Services has made the following recommendations:

1. That an Office of Procurement and Assignment of physicians, dentists, and veterinarians be established.

2. That this office shall function as part of the Office of Defense Health and Welfare Services, which is itself a part of the Office of Emergency Management.

3. The function of this office shall be to procure personnel from existing qualified members of the professions concerned. The office shall receive from various governmental and other agencies requests for medical, dental and veterinary personnel. These requests shall indicate the number of men desired, the time during which they must be secured, the qualifications and limitations placed on such personnel. The office must then by appropriate mechanism arrange to secure lists of professional personnel available to meet these requirements, utilizing such existing rosters, public and private, as it may find acceptable. It shall also be authorized to approach such professional personnel as is considered to be available and to use suitable means to stimulate voluntary enrolment.

4. The Office of Procurement and Assignment shall consist of a board of five members, one of whom shall be chairman. This board shall be chosen from members of the medical, dental or veterinary professions and shall not include any salaried employees of the federal government. This board shall function without salary but shall be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of their duties.

5. The board shall appoint an executive secretary who shall serve also as executive officer and who shall be without vote in its deliberations and decisions. He shall serve as a full time employee with salary (to be determined) and with such assistants as the board may determine necessary to carry out its functions.

6. The board shall be authorized to establish such advisory committees and subcommittees as may be necessary. These committees shall represent the various interests concerned, such as medical, dental and veterinary schools, hospitals, Negro physicians and women physicians. Members of such committees shall serve without salary but shall be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of their duties.

7. The board shall also be authorized to request various agencies of the government using medical, dental or veterinary personnel to appoint liaison officers and representatives to advise the board in carrying out its functions.

8. In carrying out its functions the board shall cooperate with such agencies as are now established under the Selective Service as well as other federal agencies.

On October 30 a letter was directed to the President by the Director of Defense Health and Welfare Services, as follows:

The coordination of the various demands made on the medical, dental and veterinary personnel of the nation and the most efficient utilization of this personnel would seem to require the establishment of a special agency capable of recording the qualified personnel available, of assigning or encouraging enlistment of such personnel in the services where most needed and of giving every qualified physician, dentist and veterinarian an opportunity to enroll himself in some service demanded by the national need.

For these reasons I wish to propose that there be established as one of the principal subdivisions of the Office of Defense Health and Welfare Services an office for the procurement and assignment of physicians, dentists and veterinarians. This office would be known as the Procurement and Assignment Agency.

The functions of the agency would be (1) to receive from various governmental and other agencies requests for medical, dental and veterinary personnel, (2) to secure and maintain lists of professional personnel available, showing detailed qualifications of such personnel, and (3) to utilize all suitable means to stimulate voluntary enrolment, having due regards for the overall public health needs of the nation, including those of governmental agencies and civilian institutions.

The agency would consist of a board of five members, one of whom would serve as chairman. The board would serve without salary but would be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of its duties.

A full time executive officer (with salary to be determined) would be appointed, together with such assistants as would be required to carry out the functions of the Agency.

I recommend that the board be composed of Dr. Frank Lahey, chairman, Dr. James Paullin, Dr. Harvey B. Stone, Dr. Harold S. Diehl and Dr. C. Willard Camalier.

This communication is addressed to you in accordance with provisions contained in paragraph 4 of the Executive Order, dated Sept. 3, 1941, "Establishing the Office of Defense Health and Welfare Services in the Executive Office of the President and Defining Its Functions and Duties," to the effect that the President shall approve the establishment of the principal subdivisions of the Office of Defense Health and Welfare Services and the appointment of the heads thereof.

In the event you approve the establishment of the Procurement and Assignment Agency, together with the board membership as recommended, I shall proceed immediately with the creation of the agency and will prepare budget estimates in the amount of approximately $50,000 for submission to the Budget Bureau to cover the costs of the agency.

In addition I would propose to instruct the Agency to draft legislation which may be necessary to submit to the Congress providing for the involuntary recruitment of medical, dental and veterinary personnel, in the event the exigencies of the national emergency appear to require it.

PAUL V. MCNUTT.

The President wrote Approved on this letter. The initial meeting of the Board of the Procurement and Assignment Service was held on November 6 in Washington. A subsequent meeting was held on November 26, and at these meetings the organization was developed as follows:

BOARD OF PROCUREMENT AND ASSIGNMENT SERVICE

Dr. Frank H. Lahey, Chairman, President, American Medical Association, Boston.

Dr. C. Willard Camalier, Chairman, Dental Preparedness Committee, American Dental Association, Washington, D. C.

Dr. Harold S. Diehl, Dean, Medical Sciences, University of Minnesota, Minneapolis.

Dr. James E. Paullin, Atlanta, Ga.

Dr. Harvey B. Stone, Associate Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore.

Dr. Sam F. Seeley, Executive Officer.

COMMITTEE ON DENTISTRY

Dr. John T. O'Rourke, Chairman, Dean, Dental School, University of Louisville, Louisville, Ky.

Dr. Leroy M. S. Miner, Dean, Dental School, Harvard University, Boston.

Dr. Frederick B. Noyes, Chicago.

Dr. Guy S. Millberry, Los Gatos, Calif.

Dr. B. K. Westfall, Indianapolis.

COMMITTEE ON HOSPITALS

Dr. Winford H. Smith, Chairman, Director, Johns Hopkins Hospital, Baltimore.

Dr. Nathaniel W. Faxon, Director, Massachusetts General Hospital, Boston.

Dr. Claude W. Munger, Director, St. Luke's Hospital, New York.

Dr. M. T. MacEachern, Associate Director, Americal College of Surgeons, Chicago.

Rev. Alphonse M. Schwitalla, S.J., Dean, St. Louis University School of Medicine, St. Louis.

COMMITTEE ON INDUSTRIAL HEALTH AND MEDICINE

Dr. C. D. Selby, Chairman, Medical Director, General Motors Corporation, Detroit.

Dr. A. J. Lanza, Assistant Medical Director, Metropolitan Life Insurance Company, New York.

Mr. William Yant, Director of Research and Development, Mine Safety Appliance Company, Pittsburgh.

Dr. Lloyd Noland, Chief Surgeon, Tennessee Coal, Iron and Railroad Company, Fairfield, Ala.

Prof. Philip Drinker, Department of Industrial Hygiene, School of Public Health, Harvard University, Boston.

Dr. George M. Smith, Department of Anatomy, Yale University School of Medicine, New Haven, Conn.

Dr. E. C. Holmblad, Chicago.

COMMITTEE ON MEDICAL EDUCATION

Dr. C. Sidney Burwell, Chairman, Dean, Harvard University Medical School, Boston.

Dr. Willard C. Rappleye, Dean, College of Physicians and Surgeons, Columbia University, New York.

Dr. John H. Musser, Professor of Medicine, Tulane University School of Medicine, New Orleans.

Dr. William S. Middleton, Dean, University of Wisconsin Medical School, Madison.

Dr. Loren R. Chandler, Dean, Stanford University School of Medicine, San Francisco.

COMMITTEE ON NEGRO HEALTH

Dr. M. O. Bousfield, Chairman, Director of Negro Health, Julius Rosenwald Fund, Chicago.

Dr. Russell A. Dixon, Dean, College of Dentistry, Howard University, Washington, D. C.

Dr. A. N. Vaughn, Surgeon, Homer G. Phillips Hospital, St. Louis.

Dr. G. Hamilton Francis, Norfolk, Va.

Mr. A. W. Dent, Superintendent, Flint Goodridge Hospital, New Orleans.

COMMITTEE ON PUBLIC HEALTH

Dr. Carl V. Reynolds, Chairman, Raleigh, N. C.

Dr. Gaylord West Anderson, University of Minnesota, Minneapolis.

Dr. Waller S. Leathers, Vanderbilt University School of Medicine, Nashville, Tenn.

Dr. Harry S. Mustard, New York.

Dr. John L. Rice, New York.

COMMITTEE ON VETERINARY MEDICINE

Dr. J. G. Hardenbergh, Chairman, Executive Secretary, Veterinary Medical Association, Chicago.

Dr. Harry W. Jakeman, President, Veterinary Medical Association, Boston.

Dr. John R. Mohler, Chief, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Dr. William A. Hagan, Dean, Cornell University College of Veterinary Medicine, Ithaca, N. Y.

Dr. Cassius Way, New York.

COMMITTEE ON WOMEN PHYSICIANS

Dr. Sara Murray Jordan, Chairman, Boston.

Dr. Ruth Evelyn Boynton, University of Minnesota, Minneapolis.

Dr. Margaret D. Craighill, Dean, Women's Medical College of Pennsylvania, East Falls, Philadelphia.

Dr. Alice Hamilton, Hadlyme, Conn.

Dr. Irma Jackson, Forest Hills, L. I., N. Y.

Dr. Ada Chree Reid, New York.

COMMITTEE ON INFORMATION

Dr. Morris Fishbein, Chicago, Chairman.

Mr. J. J. Bloomfield, Sanitary Engineer, U. S. Public Health Service, National Institute of Health, Bethesda, Md.

Dr. John F. Fulton, Yale University School of Medicine, New Haven, Conn.

Dr. Richard M. Hewitt, Mayo Clinic, Rochester, Minn.

Dr. Ira V. Hiscock, Yale University School of Medicine, New Haven, Conn.

Dr. Sanford V. Larkey, Division of Medical Sciences, National Research Council, Washington, D. C.

Dr. Robert N. Nye, Managing Editor, New England Journal of Medicine, Boston.

Consultants will be appointed to the Service, as required.

The following liaison officers have been designated by the federal agencies concerned:

Capt. Paul A. Paden, M. C., U. S. Army, Washington, D. C.

Capt. P. M. Allbright, Medical Officers Reserve Section, U. S. Navy, Washington, D. C.

Asst. Surg. Gen. Paul M. Stewart, U. S. Public Health Service, Washington, D. C.

Dr. Hugo Mella, Veterans Administration, Washington, D. C.

Lieut. Col. C. G. Parker Jr., Selective Service System, Washington, D. C.

Dr. Verne K. Harvey, U. S. Civil Service Commission, Washington, D. C.

Dr. George Baehr, Medical Director, Office of Civilian Defense, Washington, D. C.

Dr. Edwin F. Daily, Director, Division of Health Services, Children's Bureau, Washington, D. C.

DEFINITION OF PURPOSE

The primary objective of the Procurement and Assignment Service is to maintain a complete list of all physicians, dentists and veterinarians of the entire country with detailed information as to age, physical condition, professional qualifications and availability for service in the various military, civil and industrial agencies of the country. This information is to be made available to all these groups who desire to enlist the services of these professional men.

PLAN OF OPERATION

The existing facilities of the American Medical Association, American Dental Association and American Veterinary Medical Association have been graciously offered to the Procurement and Assignment Service. A regional office has been set up in Chicago in which questionnaires, rosters and punch card data pertaining to all physicians, dentists and veterinarians will be maintained and kept up to date. The Committees on Medical Preparedness of the American Medical Association, American Dental Association and American Veterinary Medical Association will be utilized in the conduct of surveys, dissemination of information to the professions and the recruitment of personnel as requisitioned by various governmental agencies. The Procurement and Assignment Service will maintain a central office in Washington, D. C. The regional office in Chicago will maintain the rosters. A board in each of the nine corps areas will consist of representatives of medical education, hospitals, the Medical Preparedness Committee of the American Medical Association and two civilian practitioners in each corps area. These boards will act in an advisory capacity with the view of assuring adequate professional care of the civilian and industrial populations within the area and in the selection of those professional people within the area who can be spared for service with the armed forces. They will function through the existing state, district and county committees on medical preparedness. The medical, dental and veterinary medical needs will be considered by committees of each of the respective professions.

After a complete survey has been made and the availability of personnel has been determined, the central office will then be prepared to furnish to all requisitioning agencies rosters of those available for duty within their organizations. The result of questionnaires clearly indicates that large numbers of physicians, dentists and veterinarians will voluntarily make themselves available for positions which will guarantee adequate professional care to the civil, industrial and military requirements. It is planned that in the very near future every physician, dentist and veterinarian will receive a questionnaire from the Procurement and Assignment Service on which he will be asked to designate his preference regarding the capacity in which he desires to contribute his maximal efforts to the successful culmination of the present national emergency. Alternate preferences will be stated and every professional man will be certified by the Procurement and Assignment Service as having volunteered his services.

From rosters maintained as a result of the foregoing information, requisitioning agencies will be furnished the names of those available as the needs arise, should expansion of the defense program require additional professional personnel. This plan is designed primarily to assure adequate personnel for the armed services and to avoid unwarranted dislocation of professional people from their present localities.

ASSIGNMENT

Rosters maintained by the Procurement and Assignment Service will be made available to all agencies requiring professional personnel. These agencies will submit requests to the Procurement and Assignment Service indicating the number and qualifications of men desired and the time during which they must be procured. These agencies will then be furnished lists of men who have been determined to meet their needs. Notification will be transmitted to these people by the Procurement and Assignment Service or by the agency to which the lists have been furnished.

This service will be available to all federal, state, industrial and civil agencies of the country. The following agencies have been represented in the initial meetings of the Procurement and Assignment Service: Army, Navy, U. S. Public Health Service, Veterans Administration, Civil Service, Office of Civilian Defense, Selective Service, Children's Bureau and Bureau of Animal Industry.

The industrial needs will be determined by the Committee on Industrial Health and Medicine.

Federal, state and county health department needs will be determined by the Committee on Public Health.

The need for women physicians will be determined by the Committee on Women Physicians.

The need for Negro physicians will be determined by the Committee on Negro Health.

The Committee on Hospitals will consider the needs of all hospitals with a view to maintaining an adequate number of staff members, interns, residents and instructors.

The Committee on Medical Education will consider the needs of medical schools from the standpoint of teaching, staffs, research facilities, and so on.

The dental and veterinary committees will survey their respective professions with a view of assuring proper disposition of members of these professions throughout the country.

DISSEMINATION OF INFORMATION

The Committee on Information is charged with the responsibility of disseminating information to all physicians, dentists and veterinarians in order that they may be kept informed of the progress of their Procurement and Assignment Service. This will be done by all available means of communication; viz. national and state medical journals, who will be kept informed of the progress. THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION has offered its services in the form of a section on the Procurement and Assignment Service, where progress of the service will be reported and a current list of the needs of the various services will be maintained, together with a report on the progress of the assignment of personnel to meet these needs.

The Procurement and Assignment Service has begun to function and the following status of requisitioning agencies has been determined:

Army.—The present allotment by the War Department of Medical Department officers as of October 31 is: Medical Corps 12,938, Dental Corps 2,911, Veterinary Corps 689. As of October 31 there were on active duty: Medical Corps 11,439, Dental Corps 2,905, Veterinary Corps 720. This leaves a shortage of "filler" replacements, as follows: Medical Corps 1,499, Dental Corps 6, Veterinary Corps none. At the present time there are sufficient Dental Corps Reserve Officers and Veterinary Corps officers to fill the present and the immediate anticipated needs. The Medical

Reserve Corps has been practically depleted, although there are many medical reserve officers who have not been called to active duty. These reserve officers are engaged in the completion of internships, are employed in positions essential to defense efforts, in a civilian capacity, or are enrolled in affiliated units which would be called to active duty in case of war. When a sufficient number has entered the service on active duty to meet the "filler" requirements, additional commissions will result in the release of those officers now on active duty who have undergone their period of training, but whose release is dependent on replacement.

On October 27 publication of an Army regulation pertaining to commissioning of officers in the Army provided for the commissioning of officers in the Medical Corps in ranks from First Lieutenant to Colonel on authority of the Secretary of War. Commissions will not be granted hereafter in the Reserve Corps but will be in the "Army of the United States." Available reserve corps officers will be utilized before those commissioned in the "Army of the United States." This regulation provides that officers commissioned in the Army of the United States will be called to immediate active duty and will be discharged from their commissions not later than six months after termination of the national emergency. This provision of immediate active duty does not apply to commissions in the Army of the United States of junior and senior medical students, twelve month interns or officers associated with affiliated units. Hereafter appointments of third and fourth year medical students will be in the Medical Administrative Corps of the Army of the United States, and appointments after graduation from medical school will be in the Medical Corps of the Army of the United States. It should be emphasized that these officers will not be called to active duty until they have completed twelve months of internship.

At the present time, with an army of 1,700,000, the Medical Department has been fortunate in that large numbers of senior officers with World War experience who have continued their services since that time are available for assignment to important positions. As a result there are no vacancies at the present time in the grades of Colonel or Lieutenant Colonel and very few vacancies in the grade of Major or Captain. This, therefore, under the present strength of the Army, calls for a large number of commissions in the Medical Corps in the junior grades. It must be borne in mind, however, that should an expansion take place large numbers of officers in senior as well as junior grades will be required. If expansion occurs, those officers now on duty who are qualified for higher grades will be promoted and officers commissioned in the Army of the United States will be commissioned in the grade that will fill the requirements.

Navy.—Medical Corps: By June 1942 the Navy will require 700 additional medical officers. It is anticipated that these needs will be filled by the commission of those completing internship and those now in the Reserve. In the Dental Corps at present there is an adequate number in the Reserve Corps to meet the anticipated needs of the near future.

Veterans Administration.—Physicians: At present there is an acute shortage of 100 physicians. The immediate need is for 100 associate physicians with Civil Service qualifications in the following fields: tuberculosis, 2; neuropsychiatry, 40; general medicine and surgery, 40; eye, ear, nose and throat, 5; roentgenology, 3; pathology, 4; urology, 2; orthopedics, 2; cardiology, 1; chest surgery, 1. For the fiscal year ending June 30, 1942 the total number of physicians required under present needs is 210. Twelve dentists are needed for this period. For the fiscal year 1943, 300 additional physicians will be required.

The needs of the Veterans Administration will increase in direct proportion to the number of patients transferred from the active military forces to the Veterans Administration during the present defense program. At the present time patients who are disabled in the military service are transferred to the Veterans Administration. As the defense program progresses, greater numbers will be transferred. The expansion will be followed carefully by the Procurement and Assignment Service, and the needs of the Veterans Administration will be transmitted to the Procurement and Assignment Service as they arise.

Public Health.—Physicians: One hundred medical officers are needed prior to Jan. 1, 1942 and approximately 150 more by June 30, 1942. About 10 new dental officers will be required by the next calendar year.

Civil Service.—Physicians: Approximately 500 physicians will be required prior to July 1, 1942. The needs for dental and veterinary personnel will be reported to the Procurement and Assignment Service as they arise.

The needs for the Office of Civilian Defense, the Selective Service and the state and local health departments parallel the needs of the civil populations, and satisfactory functioning of these agencies will depend a great deal on the appropriate allocation of professional personnel to the civil population.

Under authority of an executive order dated September 3, establishing the Office of Defense Health and Welfare Services, that office was charged with the duty to "serve as the center for the coordination of health and welfare services made available by the departments and agencies of the federal government and other agencies, public and private, to meet the needs of state and local communities arising from the defense program and take necessary steps to secure the cooperation of the appropriate federal departments and agencies relative thereto." The Procurement and Assignment Service, under the Office of Defense Health and Welfare Services, has been charged with the coordination of medical, dental and veterinary personnel for the armed services with the view of assuring adequate care of the civil and industrial population. This program represents a concerted effort on the part of every physician, dentist and veterinarian in the country, and the success of the service is assured because of their indicated willingness to serve in the national emergency. With the knowledge that the Procurement and Assignment Service will coordinate the demands of the defense program so as to minimize disruption of the present care of the civil population and the dislocation of professional people from their present localities, it is anticipated that enrolment in the various fields of endeavor by professional men will be excessive and that the carrying out of the duties of the Procurement and Assignment Service will be facilitated by the unselfish cooperation of all concerned.

ADDITIONAL LIST OF PRIORITIES AMONG HEALTH SUPPLIES

A letter from Donald M. Nelson, Director of Priorities, Office of Production Management, Washington, D. C., calls attention to preference rating order P-29, together with amendment 1 (dated October 7) to this order, which provides for a rating of A-10 for manufacturers of the health supplies listed in the order. Through this assistance, physicians should be able to secure necessary supplies and equipment from their usual sources, if their suppliers have taken advantage of the assistance made available through this order. Twelve important additions to the list of health supplies to the manufacturer of which A-10 preference rating is available have been made.

The original list, issued with the announcement of the Health Supplies Rating Plan on August 25 and published in THE JOURNAL, September 27, page 1103, contained fourteen classifications. Several of these have been extended to include more items, in addition to the new classifications set up in the amendment to Preference Rating Order P-29.

The complete health supplies list, which now covers twenty-five classifications for medical, surgical, dental and veterinarian use, follows. Those classifications marked with an asterisk are new, and items in italics are extensions of classifications set up in the original list.

* 1. Acoustical aids.
2. Anesthesia apparatus and supplies.
* 3. Atomizers (medical use only).
4. Biologicals, antitoxins, serums, *sterile ampules* and *intravenous solutions*.
5. Clinical thermometers.
6. Diagnostic equipment and *supplies*.
* 7. Hospital carts, racks and charts.
8. Hypodermic syringes and needles.
* 9. Infant incubators.
10. Instruments.
*11. Invalid chairs, walkers and crutches.
12. Laboratory equipment and supplies.
13. Medicinal chemicals (limited to medical use only).
14. Operating room *supplies* and equipment.
*15. Ophthalmic products and instruments.
*16. Physical therapy equipment (limited to medical use only).
*17. Respirators, resuscitators and iron lungs.
18. Rubber hospital sundries.
*19. Sickroom furniture, equipment and supplies.
*20. Splints and fracture equipment.
21. Sterilizers, *blanket* and *solution warmers*.
22. Surgical dressings and adhesive plasters.
*23. Surgical and orthopedic appliances (including artificial limbs and arms).
*24. Sutures and suture needles.
25. X-ray equipment and supplies.

A manufacturer of any of these items wishing to avail himself of the assistance offered by this plan should make written application to the Health Supplies Section, Office of Production Management, Washington, D. C., for form PD-79, "Report of Requirements for Scarce Materials," and at the same time file a complete catalogue showing as nearly as possible all the finished articles he manufactures.

Amendment 1 to Preference Rating Order P-29

Paragraph (*a*) (*2*) is hereby amended to read as follows:

(2) "Health Supplies" means such of the following items as are to be produced by the producer for medical, surgical, dental or veterinarian uses:

1. Acoustic aids.
2. Anesthesia apparatus and supplies.
3. Atomizers (medical use only).
4. Biologicals, antitoxins, serums, sterile ampules and intravenous solutions.
5. Clinical thermometers.
6. Diagnostic equipment and supplies.
7. Hospital carts, racks and charts.
8. Hypodermic syringes and needles.
9. Infant incubators.
10. Instruments.
11. Invalid chairs, walkers and crutches.
12. Laboratory equipment and supplies.
13. Medicinal chemicals (limited to medical use only).
14. Operating room supplies and equipment.
15. Ophthalmic products and instruments.
16. Physical therapy equipment (limited to medical use only).
17. Respirators, resuscitators and iron lungs.
18. Rubber hospital sundries.
19. Sickroom furniture, equipment and supplies.
20. Splints and fracture equipment.
21. Sterilizers, blanket and solution warmers.
22. Surgical dressings and adhesive plasters.
23. Surgical and orthopedic appliances (including artificial limbs and arms).
24. Sutures and suture needles.
25. X-ray equipment and supplies

and such additional items as may be added to the foregoing from time to time by order of the Director of Priorities.

The manufacturers of research laboratory supplies and equipment have also been granted assistance through preference rating order P-43, to which reference was made in THE JOURNAL, October 18, page 1365.

PROGRESS IN CIVILIAN DEFENSE ORGANIZATION

Emergency medical service for civilian defense is developing according to plans laid down by the Medical Division of the Office of Civilian Defense in its Bulletin No. 1 (THE JOURNAL, August 30, p. 783). A roll call made during Civilian Defense Week, November 10-16, showed that nineteen states and the District of Columbia had appointed state chiefs of emergency medical service up to that date. A total of four hundred and seventy-eight city and county governments had local chiefs of emergency medical service. Massachusetts, New York, Pennsylvania and Vermont led in these appointments. Thirty states have designated chairmen of the health and medical committees of their state defense councils; in some cases these men are also the state chiefs of emergency medical service. Following the recommendations of the Medical Division, three hundred and eighty-three hospitals have organized emergency medical field units and twenty-four such units have been organized outside of hospitals. Seventy-three of the units are located in New York State.

The Volunteer Nurse's Aide training program was reported to be under way in sixty-one Red Cross chapters, with one hundred and seventy-seven hospitals participating. The roll call showed that three hundred and forty-three aides had completed the course and had already given more than eight thousand hours of service.

MEDICAL AID TO RUSSIA AND NORWAY

The Medical and Surgical Relief Committee of America, 420 Lexington Avenue, New York, has approved sending medical and surgical aid to Russia in collaboration with established relief agencies, it was announced by Mrs. Rogers Balcom, executive chairman. In response to special appeals, quantities of sulfapyridine tablets and stainless steel Michel forceps are being assembled by the committee for use in Russian hospitals. During the past week a special request was received from the Free Norwegians in Iceland for two thousand, three hundred and thirty-six assorted instruments, 10 pounds of sulfapyridine powder for sprinkling on wounds and twenty-four physicians' first aid sets. These supplies will be used to help equip four mobile units of fifty bed capacity.

HELIUM PRODUCTION INCREASED

The helium plant operated by the U. S. Bureau of Mines at Amarillo, Texas, stepped up the production of helium last year to more than 16½ million cubic feet of this noninflammable gas, of which 15 million cubic feet was used by the government for defense and military purposes. During the last fiscal year more wells have been driven and the plant has been expanded, which it is expected will increase the capacity of helium production to about 36 million cubic feet annually. This, according to the U. S. Department of the Interior, is the only helium plant in the world.

ARMY RESERVE OFFICERS ORDERED TO ACTIVE DUTY

SEVENTH CORPS AREA

The following additional medical reserve corps officers have been ordered to extended active duty by the Commanding General, Seventh Corps Area, which comprises the states of North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Kansas, Missouri, Arkansas and Wyoming:

ABRAMSON, Milton, Captain, Minneapolis, Fort Leonard Wood, Mo.
BAKER, Joseph Harrison, Captain, LaCrosse, Kan., Corps Area Service Command Station Hospital, Fort Riley, Kan.
BASSETT, Wallace Herman, 1st Lieut., Texarkana, Ark., Corps Area Service Command Station Hospital, Camp J. T. Robinson, Ark.
COWAN, George Morterud, 1st Lieut., Knoxville, Iowa, Corps Area Service Command Induction Station, Fort Leavenworth, Kan.
DALTON, Marvin Lewis, 1st Lieut., Brinkley, Ark., Corps Area Service Command Station Hospital, Camp J. T. Robinson, Ark.
DISHONGH, Howard Allen, 1st Lieut., Little Rock, Ark., Camp J. T. Robinson, Ark.
FRICK, John Paul, Lieut. Colonel, Kansas City, Mo., Fort Leonard Wood, Mo.
HALPERIN, Phillip Harold, 1st Lieut., Kansas City, Mo., Corps Area Service Command Station Hospital, Fort Leavenworth, Kan.
HANCHEY, Carl Cecil, 1st Lieut., DeQueen, Ark., Corps Area Service Command Staiton Hospital, Camp J. T. Robinson, Ark.
KEIL, Marcus Augustine, 1st Lieut., Thompson, Iowa, Corps Area Service Command Induction Station, Camp J. T. Robinson, Ark.
KIPEN, Charles Samuel, 1st Lieut., St. Louis, Corps Area Service Command Station Hospital, Camp J. T. Robinson, Ark.
LARSON, Ralph Hertrich, 1st Lieut., Tenney, Minn., Corps Area Service Command Station Hospital, Fort F. E. Warren, Wyo.
LEUTHER, Peter Alfred, 1st Lieut., Mankato, Minn., Fort Riley, Kan.
MARKS, Roger Weston, 1st Lieut., St. Paul, Fort Riley, Kan.
MEAD, Louis Czosnyka, Major, Minneapolis, Cal-Aero Training Corporation, Grand Central Air Terminal, Glendale, Calif.
NEUFELD, Robert John, 1st Lieut., Davenport, Iowa, Rock Island Arsenal, Rock Island, Ill.
PETERS, Claude Frederick, 1st Lieut., Benton, Ark., 217th General Hospital, Fort Riley, Kan.
REYNOLDS, Garland Alexander, 1st Lieut., Cape Girardeau, Mo., Corps Area Service Command Station Hospital, Fort Leonard Wood, Mo.
SCHMIDT, John Henry, 1st Lieut., Cheyenne, Wyo., Corps Area Service Command Station Hospital, Fort F. E. Warren, Wyo.
SCORSE, Sidney William, 1st Lieut., Webb City, Mo., Corps Area Service Command Station Hospital, Fort Leonard Wood, Mo.
SIGURDSSON, Jon Olafur Stefan, 1st Lieut., West Fargo, N. D., Corps Area Service Command Station Hospital, Fort Snelling, Minn.
SILVERBERG, Charles, 1st Lieut., Richmond Heights, Mo., Fort Leonard Wood, Mo.
SIMPSON, Ronald Albert, 1st Lieut., Hutchinson, Kan., Corps Area Service Command Station Hospital, Fort Des Moines, Iowa.
SMAZAL, Stanley Francis, 1st Lieut., Davenport, Iowa, Engineer Replacement Center Infirmary, Fort Leonard Wood, Mo.
STAUFFER, Harry Beach, Major, Jefferson City, Mo., Corps Area Service Command Station Hospital, Camp J. T. Robinson, Ark.
STOCKER, William James, 1st Lieut., Fort Smith, Ark., Corps Area Service Command Station Hospital, Camp J. T. Robinson, Ark.
WASHBURN, Arthur Mansfield, Lieut. Col., Little Rock, Ark., Fort Jackson, S. C.
WICKS, William Jeremiah, 1st Lieut., Iowa City, Corps Area Service Command Station Hospital, Fort Riley, Kan.
WINDMILLER, Myrl Eugene, 1st Lieut., Kansas City, Mo., Corps Area Service Command Station Hospital, Fort Riley, Kan.

Orders Revoked

HEDEMARK, Homer Harold, Captain, Thief River Falls, Minn., Corps Area Service Command Station Hospital, Fort Leonard Wood, Mo.

Relieved from Active Duty

GINSBERG, William, Major, St. Paul, Fort Snelling, Minn.
SPIRY, Arthur William, 1st Lieut., Mobridge, S. D., Fort Riley, Kan.
STICKLER, Ralph O., 1st Lieut., Kirksville, Mo., Jefferson Barracks, Mo.
THOMPSON, Carl Oliver, 1st Lieut., Hendricks, Minn., Fort Snelling, Minn.
VAN VALKENBURG, John Donald, 1st Lieut., Floodwood, Minn., Fort Snelling, Minn.
YELLEN, Benjamin Louis, 1st Lieut., Wadsworth, Kan., Fort Riley, Kan.

NINTH CORPS AREA

The following additional medical reserve corps officers have been ordered to extended active duty by the Commanding General, Ninth Corps Area, which comprises the states of Washington, Montana, Oregon, Nevada, Utah, California and Idaho:

ANDERSON, Murl O., Captain, Hardin, Mont., Third Division, Fort Lewis, Wash.
ANDREWS, Harry H., 1st Lieut., Sumner, Wash., Fort Stevens, Ore.
BAISINGER, Leo F., 1st Lieut., Bakersfield, Calif., Fort Ord, Calif.
BARBOUR, Nathan P., Lieut. Colonel, Lockeford, Calif., Camp Cooke, Lompoc, Calif.
BOLTON, Leslie T., Lieut. Colonel, Reno, Nev., Fort Winfield Scott, Calif.
BURLESON, Ferris C., 1st Lieut., San Jose, Calif., Station Hospital, Camp Roberts, Calif.
CAWLEY, John J., 1st Lieut., Bakersfield, Calif., Office of Corps Area Surgeon pending assignment to Hawaiian Department.
CHOY, Frank Jue, 1st Lieut., San Francisco, Camp Grant, Ill.
DEHNE, Edward J., 1st Lieut., Coquille, Ore., Fort McDowell, Calif.
DITTES, Albert G., 1st Lieut., Glendale, Calif., 808th Engineer Battalion (Aviation), March Field, Calif.
EFFRON, Morton, 1st Lieut., Los Angeles, Camp Callan, Calif.
EGGLESTON, John R., 1st Lieut., Santa Monica, Calif., Station Hospital, Fort Ord, Calif.
FRIBORG, Arnold E., 1st Lieut., Brief, Wash., Station Hospital, Fort Lewis, Wash.
GALLAGHER, Hiram, Captain, San Anselmo, Calif., Camp Seeley, Calif.
JOHNSON, George H., 1st Lieut., Vancouver, Wash., Fort Lawton, Wash.
JONAS, Carl H., 1st Lieut., Medical Lake, Wash., Camp Haan, Calif.
KIMURA, Jiro, 1st Lieut., Berkeley, Calif., Medical Replacement Center, Camp Grant, Ill.
LEE, Gilbert, 1st Lieut., Los Angeles, 58th Quartermaster Regiment, Stockton, Calif.
LEVITT, Louis, 1st Lieut., Worden, Mont., 183d Field Artillery, Fort Francis E. Warren, Wyo.
LEWE, Irving A., 1st Lieut., Los Angeles, Camp Roberts, Calif.
LOMAS, Max L., 1st Lieut., Los Angeles, 3d Coast Artillery, Fort MacArthur, Calif.
MARKS, Roland F., Captain, Hillsborough, Calif., Fort Winfield Scott, Calif.
MEYER, Vincent S., 1st Lieut., Los Altos, Calif., Camp Sibert, Calif.
MIYAUCHI, Yukio, 1st Lieut., Santa Maria, Calif., Camp Grant, Ill.
NEWTON, Abram M., Major, Pocatello, Idaho, Station Hospital, Fort Lewis, Wash.
O'CONNOR, Michael J., 1st Lieut., San Mateo, Calif., Camp Callan, Calif.
ROSSITER, Stanford B., 1st Lieut., San Francisco, Camp Seeley, Calif.
RUDEN, S. J., 1st Lieut., Eureka, Calif., Fort Worden, Wash.
SAWYER, Harry W., Jr., 1st Lieut., Fallon, Nev., 216th Coast Artillery, Camp Haan, Calif.
SHEAFE, Earle V., Lieut. Colonel., Oakland, Calif., Station Hospital, Fort Ord, Calif.
SHUMAN, John W., Lieut. Colonel, Santa Monica, Calif., Fort Ord, Calif.
SOUTH, Francis Floyd, Major, Portland, Ore., Fort Stevens, Ore.
STOCKTON, Christopher, 1st Lieut., Bakersfield, Calif., Third Army Corps, Presidio of Monterey, Calif.
ST. PIERRE, Roderick G., Captain, Portland, Ore., Fort Stevens, Ore.
STROUSE, Carl D., 1st Lieut., Hollywood, Calif., 41st Division, Fort Lewis, Wash.
TALBOT, John C., 1st Lieut., Berkeley, Calif., Induction Station, Portland Recruiting District, Portland, Ore.
TOMA, John J., 1st Lieut., Los Angeles, Fort Rosecrans, Calif.
WARD, Henry C., 1st Lieut., Long Beach, Calif., Station Hospital, Camp Roberts, Calif.
WATTS, Floyd J., 1st Lieut., Sebastopol, Calif., Camp Roberts, Calif.
WILCOX, Charles F., Major, Los Angeles, Camp San Luis Obispo, Calif.
WILSON, Kent R., Captain, Santa Barbara, Calif., Camp Roberts, Calif.

Orders Revoked

ARNOWITZ, Isaac, 1st Lieut., San Francisco.
CHAMPOUX, Clement G., 1st Lieut., Selah, Wash., Camp Clatsop, Ore.
DAGGETT, Gilbert G., 1st Lieut., Madera, Calif., Fort Worden, Wash.
EDELSON, Zanly C., 1st Lieut., Portland, Ore.
FREDRICKSON, Clyde H., Lieut. Col., Missoula, Mont.
RUKKE, Raymond V., 1st Lieut., Monterey, Calif.
SCHADE, George H., 1st Lieut., Camp Haan, Calif.

Relieved from Active Duty

PETERFY, Richard A., Captain, Camp San Luis Obispo, Calif.
PORTER, James L., 1st Lieut., Camp McQuaide, Calif.

Resignation

O'NEILL, Thomas J., 1st Lieut., Fort Rosecrans, Calif.

ORDERED TO FOREIGN DUTY

GREENE, Arthur Morton, 1st Lieut., Station Dispensary, Albrook Field, Canal Zone.
HERMES, Richard Lawrence, 1st Lieut., Ponce, Puerto Rico, Flight Surgeon's Office, Borinquen Field, Puerto Rico.
JACOB, Samuel Sprigg, III, Captain, Corozal, Canal Zone.
MANGIMELLI, Samuel Thomas, 1st Lieut., 70th Medical Battalion, Corozal, Canal Zone.
MOSIMAN, William Dillon, 1st Lieut., Morton, Ill., Headquarters, Philippine Department, Fort Santiago, Manila.

ORGANIZATION SECTION

OFFICIAL NOTES

FOURTH ANNUAL CONGRESS ON INDUSTRIAL HEALTH

Arrangements have been largely completed for the fourth annual Congress on Industrial Health sponsored by the American Medical Association, which will be held Monday and Tuesday, Jan. 12-13, 1942, at the Palmer House in Chicago. These meetings are open to physicians and others interested in industrial health. There is no registration fee. Topics and speakers are as follows:

OPENING SESSION, MONDAY, 9:45 A. M.

Report of the Council on Industrial Health.
STANLEY J. SEEGER, M.D., Chairman, Texarkana, Texas.
Procurement and Assignment of Physicians in Industry.
(Speaker to be announced.)
Lecture on Industrial Medicine.

Tuberculosis in Industry—A Résumé.
LEROY U. GARDNER, M.D., Saranac Lake, N. Y.
Director, the Saranac Laboratory for the Study of Tuberculosis.
The Physiology of Work.
A. C. IVY, M.D., Chicago.
Professor of Physiology, Northwestern University School of Medicine.
Medical Aspects of Vocational and Industrial Training.
W. A. SAWYER, M.D., Rochester, N. Y.
Chairman, Committee on Industrial Health, Section on Preventive and Industrial Medicine and Public Health, American Medical Association.

Red Lacquer Room

MONDAY AFTERNOON, 2:30

A Dental Program for Industry.
R. M. WALLS, D.D.S., Bethlehem, Pa.
Chairman, Committee on Economics, American Dental Association.
Industrial Dermatoses.
A Report by the Committee on Industrial Dermatology, Section on Dermatology and Syphilology, American Medical Association.
C. GUY LANE, M.D., Chairman, Boston.
CHARLES C. DENNIE, M.D., Kansas City, Mo.
JOHN G. DOWNING, M.D., Boston.
HARRY FOERSTER, M.D., Milwaukee.
EDWARD A. OLIVER, M.D., Chicago.
MARION SULZBERGER, M.D., New York.
The Panel System in Workmen's Compensation Administration.
DAVID J. KALISKI, M.D., New York.
Director, Committee on Workmen's Compensation, Medical Society of the State of New York.
Mass X-Ray Surveys—Evaluation of Technics and Equipment.
MAJOR ALFRED A. DE LORIMIER, M.C., Washington, D. C.
Director, Department of Roentgenology, Army Medical School.

Red Lacquer Room

MONDAY AFTERNOON, 2:30

SYMPOSIUM ON UNDERGRADUATE INDUSTRIAL MEDICAL EDUCATION

Present Problems in Curriculum Adjustment.
WILLIAM D. CUTTER, M.D., Chicago.
Secretary, Council on Medical Education and Hospitals, American Medical Association.
Industrial Health—A Separate Discipline.
T. LYLE HAZLETT, M.D., East Pittsburgh, Pa.
Professor of Industrial Hygiene, University of Pittsburgh School of Medicine.
Coordination of Industrial Hygiene with Clinical Teaching
DONALD E. CUMMINGS, Denver.
Director, Division of Industrial Hygiene, University of Colorado School of Medicine and Hospitals.
The Industrial Clinical Clerkship.
FRED J. WAMPLER, M.D., Richmond.
Professor of Preventive Medicine, Medical College of Virginia.
Industrial Experience in the Internship.
WILL F. LYON, M.D., Chicago.
Assistant Professor of Surgery, University of Illinois College of Medicine.
The Occupational Disease Clinic.
MILTON H. KRONENBERG, M.D., Chicago.
Assistant Professor of Bacteriology and Public Health, University of Illinois College of Medicine.

Room 17

MONDAY EVENING, 6:30

An informal dinner and round table discussion, intended primarily for state and county medical society committees on industrial health, will be held. The program will include:

Use of Visiting Nurses in Industry.
MISS JOANNA JOHNSON, R.N., Milwaukee.
Chairman, Industrial Nursing Section, National Organization for Public Health Nursing.
Progress in Official Agencies.
J. J. BLOOMFIELD, Bethesda, Md.
Chief, States' Relations Section, U. S. Public Health Service, National Institute of Health.
Postgraduate Education in Industrial Health.
WALTER L. BIERRING, M.D., Des Moines, Iowa.
Commissioner, State of Iowa Department of Health.

Crystal Room

TUESDAY MORNING, 9:30

Conservation of Manpower in Connecticut.
CLIFFORD KUH, M.D., New Haven, Conn.
Chairman, Committee on Industrial Health, Connecticut State Medical Society.
Health Education for Industrial Workers.
LEVERETT D. BRISTOL, M.D., New York.
Chairman, Committee on Education and Publications, Council on Industrial Health, American Medical Association.
Lecture on Traumatic Surgery.
(Speaker to be announced.)
Industrial Ophthalmology.
A Report by the Committee on Industrial Ophthalmology, Section on Ophthalmology, American Medical Association.
ALBERT C. SNELL, M.D., Chairman, Rochester, N. Y.
ARTHUR CULLER, M.D., Dayton, Ohio.
HEDWIG S. KUHN, M.D., Hammond, Ind.
Placement of the Worker in Industry.
JOSEPH TIFFIN, PH.D., Lafayette, Ind.
Professor of Industrial Psychology, Purdue University.

Red Lacquer Room

TUESDAY AFTERNOON, 2:30

Conservation of Hearing in Industry.
C. C. BUNCH, PH.D., Evanston, Ill.
Department of Speech Reeducation, School of Speech of Northwestern University.
Recent Trends in Physical Examinations Under Civil Service.
VERNE K. HARVEY, M.D., Washington, D. C.
Medical Director, U. S. Civil Service Commission.
Vitamin Administration in Industry.
A Report Prepared by Representatives of the Council on Foods and Nutrition and the Council on Industrial Health.
J. S. MCLESTER, M.D., Birmingham, Ala.
GEORGE R. COWGILL, PH.D., New Haven, Conn.
R. M. WILDER, M.D., Rochester, Minn.
LEVERETT D. BRISTOL, M.D., New York.
LEROY U. GARDNER, M.D., Saranac Lake, N. Y.
CLARENCE D. SELBY, M.D., Detroit.
Medical Service Plans for Small Industry.
MYER S. BLOOM, M.D., Binghamton, N. Y.

Red Lacquer Room

WEDNESDAY, JANUARY 14

Field trips have been arranged for a limited number of physicians interested in details of industrial medical department administration. Further details will be provided to registrants during the Congress.

Also on Wednesday, January 14, a clinical program will be held in conjunction with the University of Illinois College of Medicine, illustrating practical problems in industrial medicine, industrial hygiene and traumatic surgery.

CLINICAL PROGRAM

University of Illinois College of Medicine,
1853 West Polk Street, Room 423,
Chicago

WEDNESDAY MORNING, 9:30

Pulmonary Capacity Tests in Health and Disease.
Demonstration:
GEORGE E. WAKERLIN, M.D.
Professor of Physiology.
Difficulties and Fallacies of Interpretation of Chest X-Ray Films.
Demonstration:
ADOLPH HARTUNG, M.D.
Professor of Radiology.
Practical Points on Patch Testing in Occupational Dermatitis.
Demonstration:
LEONARD F. WEBER, M.D.
Associate Professor of Dermatology.
Urinary, Blood and Other Tests of Value in Cases of Industrial Toxicology.
Demonstration:
WILLIAM D. MCNALLY, M.D.
Coroner's Chemist, Cook County, Chicago.

WEDNESDAY AFTERNOON, 2:00

Evaluating the Traumatic Abdomen.
CHARLES A. PUESTOW, M.D.
Associate Professor of Surgery.

Dental and Oral Manifestations of Occupational Origin.
ISAAC SCHOUR, D.D.S., PH.D.
Professor of Dental Histology,
and
BERNARD SARNAT, D.D.S., M.D.
College of Dentistry.

The Industrial Hernia—Is It a Cause for Rejection?
WILL F. LYON, M.D.
Associate Professor of Surgery.

The Occupational Anemias.
CARROLL BIRCH, M.D.
Assistant Professor of Medicine.

ADDRESSES BY THE PRESIDENT AND THE PRESIDENT-ELECT

Dr. Frank H. Lahey, President of the American Medical Association, has been scheduled to deliver the following addresses during December:

December 2.—Rochester Academy of Medicine, Rochester, N. Y.

December 4.—Harrisburg Academy of Medicine, Harrisburg, Pa.

Dr. Fred W. Rankin, President-Elect of the American Medical Association, has been scheduled to deliver the following addresses:

December 9.—Southern Surgical Association, Pinehurst, N. C.

December 15.—Fulton County Medical Society, Atlanta, Ga.

EXHIBITS FROM HEADQUARTERS

December 1-5.—Wells High School, Chicago (Health Week):
"Periodic Health Examination."
"Prevention of Accidents."

December 1-5.—Carl Schurz High School, Chicago (Health Week):
"Health Material."

December 3.—Woman's Hospital, Detroit (Annual Clinical Hospital Day):
"The Use and Abuse of Barbiturates."

December 4.—Detroit Institute of Technology, Detroit (Open House, College of Pharmacy and Department of Chemistry):
"The Use and Abuse of Barbiturates."

December 4.—Women's Auxiliary, Marion County Medical Society, Fairmont, W. Va. (Health Institute):
"Your Health."

December 11-14.—Health Exposition, Kansas City, Mo.:
"The Human Factory."
"Respiratory System in Health and Disease."
"Heart Disease."
"Syphilis."
"Cancer."
"Prevention of Burns."
"Dangers of Self Diagnosis and Self Medication."
"Mechanical Nostrums."
"The Public Health."

WOMAN'S AUXILIARY

New York

At a business meeting of the Fulton County auxiliary at the home of Mrs. J. Edward Grant of Northville, the card party held at the Adirondack Inn, Sacandaga, in July by the auxiliary for Bundles for Britain was reported to have netted $114, which will be divided equally between the Gloversville and Johnstown branches of the organization. The auxiliary made it possible for one underprivileged child to spend one week at the Fulton County Children's Camp during the summer.

At the first fall meeting of the Herkimer County auxiliary held in Herkimer, the guest speaker was Mrs. Marcus DeWolfe, who spoke on India. Mrs. DeWolfe lived there several years. The members discussed the advisability of meeting every month. The by-laws were revised and it will meet every month, the alternate month to serve as a sewing bee for the British War Relief. The summer camp at Pine Crest Sanatorium is its pet activity. The auxiliary held a card party and raised $70, with which a slide was purchased for the playground.

Mrs. George B. Adams, president of the state auxiliary, addressed the Onondaga County auxiliary on May 29, when Mrs. George Sincerbeaux, retiring president, presented the gavel to Mrs. Carlton Bullard; other officers for the year include: first vice president Mrs. J. D. Sands, second vice president Mrs. Jason L. Wiley, treasurer Mrs. Herbert Jones, secretary Mrs. A. B. Chidester. It was decided to send two girls to the Girl Scout Camp for two weeks.

Attended by more than two hundred people, a ball was held at the Elks Club in Hudson by the women's auxiliary of Columbia County for the benefit of Bundles for Britain. Mrs. Henry C. Galster, president of the Hudson branch, was the chairman. Guests were present from New York, New Rochelle, Amsterdam, Albany and most of the towns of the county. The amount realized was over $200.

South Dakota

At a meeting of the board of the Woman's Auxiliary to the South Dakota State Medical Association in Sioux Falls, November 18, the national president of the Woman's Auxiliary to the American Medical Association, Mrs. R. E. Mosiman of Seattle, spoke on different phases of the auxiliary work; other guests of honor were Mrs. F. C. Nilsson, president of the South Dakota Auxiliary, Sioux Falls, and Mrs. Zelda Krueger, Red Cross executive secretary. The Seventh District Medical Auxiliary were hosts at a luncheon which was attended by thirty-five members from throughout the state.

Wisconsin

The Woman's Auxiliary to the Dane County Medical Society presented Dr. Paul C. Barton in a talk on "Beauty Aids and Adds" in Madison, May 12.

At Fond du Lac on May 22, the Woman's Auxiliary to the Fond du Lac County Medical Society voted to send eight girl scouts to camp in the summer. Reports of recent card parties showed that $73.50 had been cleared for philanthropic projects. Mrs. W. C. Finn of Fond du Lac is the new president, chosen to succeed Mrs. A. M. Hutter.

Gardens in May occupied the attention of the Woman's Auxiliary to the Milwaukee County Medical Society.

Mr. Robert Boerner of the Milwaukee Park Commission addressed the May 9 meeting. Colored slides of the flowers in Milwaukee parks were shown.

Activities in April and May included a luncheon at Hart House, near Milwaukee, at which the president, Mrs. C. D. Partridge, entertained the officers and board of directors, and a luncheon at the Wisconsin Club, Milwaukee, given by the officers, directors and past presidents in honor of Mrs. Partridge.

At their annual open meeting in Appleton, May 5, twenty-two members of the Woman's Auxiliary to the Outagamie County Medical Society were hostesses to two hundred and fifty guests. The speaker, Dr. Amy Louise Hunter of Madison, chief of the bureau of maternal and child health for the state of Wisconsin, discussed infantile paralysis, premature babies, education for motherhood and prevention of tuberculosis.

The Rock County auxiliary met in Beloit, May 27, to hear Mrs. Wayne Munn of Janesville give a reading of "The American Way."

The Woman's Auxiliary to the Waukesha County Medical Society entertained fifty people at a presidents' tea at the home of Mrs. A. G. Nixon in Hartland, May 22. Presidents and other representatives of lay organizations were invited to hear Mr. George Larson, assistant secretary of the Wisconsin State Medical Society, speak on experiments in voluntary sickness insurance. The audience asked many questions of the speaker. The auxiliary voted $10 to the Dousman Home and Farm School for Boys toward a fund to provide adequate isolation facilities for scarlet fever cases.

In May, Mrs. Gerald H. Friedman of Milwaukee, state Hygeia chairman, reported that Wisconsin had exceeded the 1940 quota; to date, subscriptions number 880, compared with last year's 875.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Physicians' Art and Garden Societies.—The Los Angeles Physicians Art Society opened the fall season with a dinner at the Los Angeles County Medical Association on November 28. Mr. Roger Noble Burnham, Los Angeles, modeled a portrait in relief of a member of the audience, and Mrs. Burnham discussed the history of sculpture. The Los Angeles County Medical Garden Club recently held its fall flower show. Officers of the garden club include Drs. Robert B. Hope, president; Hyman Miller and Albert G. Bower, vice presidents, and Samuel Ayres Jr., secretary.

New Comprehensive Study of the Common Cold.—The University of California Medical School, San Francisco, began a comprehensive two year study of the common cold and other respiratory diseases in November. Ten members of the staff of the university will carry on the research under the direction of Dr. William J. Kerr, professor of medicine. One phase will be a study of the physical influences caused by changes in the weather and overcooling. A special room has been built large enough for six persons, in which the temperature and humidity of the air can be changed to any climatic condition quickly and at will. An attempt will be made to correlate all the facts concerning conditions which make a person susceptible to a cold.

ILLINOIS

Plan to Release "Socially Safe" Mental Patients.—Dr. Alfred P. Bay, assistant managing officer of the Alton State Hospital, Alton, has been appointed assistant state alienist to direct the program under which state officials propose to release several thousand "socially safe" patients from state mental hospitals, newspapers reported recently. Dr. Bay will supervise an outpatient clinic plan under which patients released will report regularly to hospital physicians for examination. He will be responsible for the release of patients at the Alton, Anna, Peoria, Jacksonville and East Moline hospitals.

Society News.—Dr. George L. Drennan, Jacksonville, discussed "Deafness in Childhood" before the Madison County Medical Society in Collinsville, October 3.——Dr. George C. Turner, Chicago, discussed "Early Diagnosis of Pulmonary Tuberculosis" before the Madison County Medical Society in Edwardsville, November 7.——The Peoria Medical Society and the local dental society were addressed at a joint dinner meeting in Peoria, November 18, by Dr. Joseph E. Schaefer, Chicago, on "Repair of Facial Injuries." The medical society was addressed, November 4, by Dr. Franklin G. Ebaugh, Denver, on "New Factors Regarding Mental Disorders."

Chicago

The Ludvig Hektoen Lecture.—The eighteenth Ludvig Hektoen Lecture of the Frank Billings Foundation, Institute of Medicine of Chicago, will be delivered on January 23 at the Palmer House by Dr. Stanhope Bayne-Jones, professor of bacteriology, Yale University School of Medicine, New Haven, on the subject "Tetanus."

INDIANA

Crum Guilty of Gross Immorality in Use of Etherator.—The Supreme Court of Indiana on November 3 upheld the action of the board of medical registration and education in revoking three licenses held by Heil E. Crum, one authorizing him to practice naturopathy, another to practice chiropractic and a third to practice electrotherapy, on the ground that the licentiate was guilty of "immoral conduct." The evidence disclosed that, after attending high school, Crum entered the College of Drugless Physicians in Indianapolis, from which he was graduated at the end of one year with the degrees of doctor of naturopathy, doctor of electrotherapeutics, doctor of chiropractic and doctor of herbal materia medica. "The evidence supports the inference," said the Supreme Court, "that this institution was nothing more than a 'diploma mill.'" Crum received his three licenses, without examination, by virtue of a clause in the 1927 medical practice act of Indiana, commonly referred to as a "grandfather" clause, under which licenses were issued to persons already practicing any system or method of healing taught by the school or college of which the applicant was a graduate. The gist of the complaint against Crum was that he employed a mechanical contrivance called an "etherator" or "coetherator" which was totally devoid of any therapeutic value. As described by the Supreme Court, the etherator was a small wooden box with a number of holes in the front over which various colors of thin paper were pasted. On the inside was an ordinary light bulb with a cord for making contact with electricity. The bulb could be moved about so that the light would penetrate the various paper covered holes. The box contained a quantity of disconnected wire such as is commonly used for radio aerials and a glass tube filled with ordinary hydrant water. There was a pedal and a dial on the outside of the box, neither of which had any connection with the interior. The method used in treating human ailments was to have the patient moisten a slip of paper with saliva and deposit it through a slot on the top of the box, although it was claimed that the same results could be obtained by similar use of the patient's photograph or a specimen of his handwriting. After this was done, Crum would rub the pedal with his thumb and talk to the machine, repeating the popular names of diseases and organs of the body. Many of the diseases which he claimed to be able to treat and relieve, and in some instances cure, were cancer, blindness, arthritis, nervous disorders, hemorrhoids, abscesses, kidney ailments, stomach disorders, leakage of the heart, skin ailments, ovarian trouble, varicose veins and tumors. Crum further claimed that he could lengthen or shorten a patient's legs, cause amputated fingers to grow back into place and fill cavities in teeth, not with a foreign substance but by restoring them to their original condition. He said that it was not necessary for patients to be present or visit his office but that he could broadcast treatments to them wherever they might be located. By use of the machine, he claimed, he could fertilize fields to a distance of 70 miles, could kill dandelions over any particular area, could treat golf greens and could give financial treatments by means of which money could be put into the hands of his patients. The mere mention of the extravagant claims made by Crum, the court thought, was sufficient to suggest their untruthfulness and brand them as designedly fraudulent. Crum contended that by virtue of the three licenses that had been issued to him the state had authorized him to engage in the activities that prompted the revocation proceeding. In answer to this contention the Supreme Court considered it unnecessary to undertake to define the practice of chiropractic, naturopathy or electrotherapy. To the court it was enough to say that it could not be judicially presumed that the legislature intended to authorize a course of conduct so reprehensible and revolting as to shock the sensibilities of reasonable men.

IOWA

Postgraduate Lectures.—The speakers' bureau of the Iowa State Medical Society sponsored the following postgraduate lectures during November:

Dr. Kellogg Speed, Chicago, A Discussion of War Wounds, Davenport, November 4.
Dr. Jerome R. Head, Chicago, Chest Injuries, Marshalltown, November 4.
Dr. Willis M. Fowler, Iowa City, Diseases of the Blood, Newton, November 4.
Dr. Paul C. Bucy, Chicago, Making a Neurologic Examination in General Practice, Ottumwa, November 4.
Dr. Horace M. Korns, Iowa City, Diagnosis and Treatment of Pneumonia, Newton, November 11.
Dr. John W. G. Caldwell, Des Moines, Recent Treatment of Pneumonia, Toledo, November 13.
Dr. Harold F. Buchstein, Minneapolis, Making a Neurological Examination, Jefferson, November 13.
Dr. Arthur U. Desjardins, Rochester, Minn., Therapeutic Value of X-Ray, Boone, November 13.
Dr. Wilbur C. Thatcher, Fort Dodge, Management of Obstetric Difficulties, Spirit Lake, November 18.
Dr. Walter A. W. Kirch, Des Moines, Common Diseases of the Ear, Nose and Throat, Ottumwa, November 18.
Dr. Frank R. Peterson, Iowa City, Acute Surgical Conditions in the Abdomen in Childhood, Newton, November 18.
Dr. Daniel J. Glomset, Des Moines, Treatment of Heart Failure, Red Oak, November 18.
Dr. Frederic W. Schlutz, Chicago, Common Disease of Childhood, Carroll, November 20.
Dr. Dean M. Lierle, Iowa City, Diagnosis and Treatment of Common Conditions of the Ear, Nose and Throat, Newton, November 25.

KANSAS

Dr. Westman Named Federal Consultant in Epidemiology.—Dr. Ragnar T. Westman resigned as health director of Kansas City November 1 to assume rank as surgeon of the U. S. Public Health Service and serve as federal consultant in epidemiology to extra cantonment and defense areas, it is reported. He is stationed in Bethesda, Md.

Society News.—The Sedgwick County Medical Society designated its November 18 meeting as "University of Kansas School of Medicine Night"; the speakers were Drs. Harry R. Wahl, dean of the school, on activities of the school; John A. Billingsley, Kansas City, "Aniseikonia"; Mahlon H. Delp, Kansas City, "Treatment of Arsenical Dermatitis with Vitamin C," and Frank C. Neff, Kansas City, Mo., "Adrenal Androgenic Tumors."

Cooperating Committees on Legal Medicine.—The Kansas Medical Society and the Kansas Bar Association have appointed committees on legal medicine to study jointly and prepare recommendations on matters of interest to both the legal and the medical profession. Members of the bar association committee are Mr. Claude I. Depew, Wichita, chairman; Mr. Roy C. Davis, Hutchinson; Mr. John H. Hunt, Topeka; Mr. Oscar P. May, Atchinson; Mr. Larue Royce, Salina, and Mr. Thomas M. Van Cleave, Kansas City. Members of the medical society's committee are Drs. Earl L. Mills, Wichita; Clyde D. Blake, Hays; Eugene J. Bribach, Atchison; John J. Brownlee, Hutchinson; John L. Lattimore, Topeka, and Laurence S. Nelson, Salina.

MICHIGAN

Personal.—Dr. Charles H. P. G. Benning, Royal Oak, deputy commissioner of health of Oakland County for more than thirteen years, has been assigned to the department of health of Puerto Rico, San Juan, as venereal disease consultant by the U. S. Public Health Service.——Dr. Thomas P. Crane, Dearborn, has been placed in charge of the outpatient department at the Veterans' Administration Facility in Dearborn, succeeding Dr. Edward O. Sage, who was transferred to New Orleans.——Citizens of Baraga sponsored a dinner recently in honor of the seventy-fifth birthday of Dr. Romulus S. Buckland who has been practicing in Baraga for forty-one years. He was presented with a plaque bearing a replica of himself mounted on horseback.

Society News.—Dr. Lyman T. Rawles, Fort Wayne, Ind., is the new president of the Northern Tri-State Medical Association. Other officers of the association, which met in annual session in Detroit recently, include Drs. E. Benjamin Gillette, Toledo, vice president; Douglas Donald, Detroit, treasurer, and Floyd R. N. Carter, South Bend, secretary. The sixty-ninth annual meeting of the association will be held in Fort Wayne, April 7, 1942.——Dr. Ernest E. Irons, Chicago, addressed the medical section of the Wayne County Medical Society, Detroit, November 10, on "Aspiration Pneumonia." Dr. Michael L. Mason, Chicago, discussed "Significant Factors in the Development of Infections of the Hand" before the surgical section of the society, October 27.——Dr. Herman H. Riecker, Ann Arbor, addressed the Calhoun County Medical Society, Battle Creek, October 7, on "Classification and Management of Hypertension."

NEBRASKA

Hospitals Cooperate in Clinic.—The staffs of the Lincoln General and Bryan Memorial hospitals, Lincoln, sponsored a two day clinic, October 17-18, with sessions at both hospitals. Included among the guest speakers were Drs. Fred J. Hodges, professor of roentgenology and chairman of the department, Stanley M. Goldhammer, assistant professor of internal medicine, University of Michigan Medical School, Ann Arbor, Philip M. Northrop, D.D.S., assistant professor of oral surgery, University of Michigan School of Dentistry, Ann Arbor, and Dr. Robert Lee Hoffmann, Kansas City, Mo.

NEW JERSEY

Society News.—Dr. Thomas Fitz-Hugh Jr., Philadelphia, discussed "Management of Anemia in General Practice" before the Camden County Medical Society in Camden, November 4.——The Hudson County Medical Society was addressed in Jersey City, October 7, by Dr. James William Hinton, New York, on thyroid disease.

New State Director of Health and Physical Education.—Dr. Wilson G. Guthrie, Newark, has been appointed director of health and physical education of the state department of public instruction to succeed the late Dr. Allen G. Ireland, Trenton. Dr. Guthrie graduated at the University of Tennessee College of Medicine, Memphis, in 1918.

NEW YORK

Appointments to Industrial Council.—Dr. Benjamin M. Eis, Brooklyn, has been appointed a member of the state industrial council to fill a vacancy caused by the death of Dr. Henry Joachim, Brooklyn, and Dr. Van S. Laughlin, Westfield, has been named to fill a vacancy that occurred with the resignation of Dr. William D. Johnson, Batavia.

Annual Surgical Session at Buffalo.—The annual meeting and clinical day of the Western New York Surgical Society was held at the Edward J. Meyer Memorial Hospital, Buffalo, November 27, with Drs. John D. Stewart, Buffalo, and Edward D. Churchill, John Homans professor of surgery, Harvard Medical School, Boston, as guest speakers. Others on the program included:

Dr. Henry N. Kenwell, Buffalo, Liver Abscess with the Report of the Surgical Treatment of a Recent Case.
Dr. Donald P. Ross, Niagara Falls, Gastric Resection for Peptic Ulcer.
Dr. George W. Cottis, Jamestown, Perpetuation of the Fallacy of Peritoneal Drainage.
Dr. Joseph D'Errico Jr., North Tonawanda, Surgery of Renal Anomalies.
Dr. James P. Cole, Buffalo, Importance of the Lumbosacral Joint in Low Back Pain.
Dr. Leon J. Leahy, Buffalo, Surgical Collapse Therapy in Pulmonary Tuberculosis.

New York City

Professor Appointed.—Dr. William Carson Von Glahn, formerly associate professor of pathology at Columbia University College of Physicians and Surgeons, has been appointed professor of pathology at New York University College of Medicine and director of the department of pathology and laboratories at Bellevue Hospital. An agreement worked out between the city and New York University gives the university the privilege of nominating all members of the department of pathology of Bellevue Hospital and of the laboratory staff, it is reported.

Conference on Tuberculosis.—The Tuberculosis Sanatorium Conference of Metropolitan New York will sponsor a meeting on chronic pulmonary diseases at Cornell University Medical College December 10. Dr. Max Pinner, chief of the division of pulmonary diseases, Montefiore Hospital for Chronic Diseases, will read a paper on "Experimental Studies on Bronchiectasis and Atelectasis," which was prepared by Dr. Pinner and Dr. Joseph Tannenberg, Batavia. Dr. John E. Leach, clinical assistant in medicine, Memorial Hospital for the Treatment of Cancer and Allied Diseases, will present a paper on "Radiation Pleuropulmonitis."

Survey of Abortion Racket.—A comprehensive survey of a citywide abortion racket was handed up in presentment form in Brooklyn Supreme Court, October 15, according to the New York *Times*. The grand jurors recommended a campaign of public education against the dangers of abortions and a penal code provision making it a misdemeanor to offer to perform a criminal abortion or to refer a patient to another physician for an illegal operation. The report also recommended increased vigilance by local police in detecting and reporting establishments for abortions and an interchange of information between the department of education and the police department. The replacement of the present medical grievance committee of ten members serving part time without compensation by a full time committee of physicians with compensation was also urged.

Lectures on Occupational Diseases.—The Medical Society of the County of Kings and Academy of Medicine of Brooklyn opened a course of lectures on industrial health and occupational diseases in Brooklyn, November 24. "Origins and Growth in Industrial Health" was discussed in the first series by Dr. Alfred E. Shipley, Brooklyn, Eugene B. Patton, director, division of statistics, New York State Department of Labor, and a speaker whose name was not announced. Other lectures include:

Drs. Samuel J. Kopetzky, New York, Albert F. R. Andresen, Brooklyn, Alec N. Thomson, Brooklyn, and Charles F. McCarty, Brooklyn, Role of the County Medical Society in an Industrial Health Program and the National Defense Program, December 1.
Mr. Henry D. Sayer, Drs. David J. Kaliski, New York, and Fred L. Moore, Brooklyn, Compensation Law: Progress and Present Interpretation, December 8.
Drs. John Hamilton Crawford, Brooklyn, and George G. Ornstein, New York, Relationship Between Injury and Disease, December 15.
Drs. Louis Berger, Joseph B. L'Episcopo, Samuel Potter Bartley and William E. Howes, Brooklyn, Traumatic and Orthopedic Surgery, January 5.
Drs. John E. Jennings, Joseph E. Golding and Edwin K. Morgan, Brooklyn, Traumatic Surgery, January 12.

Various aspects of occupational diseases will be discussed by Drs. Leonard Greenburg and May R. Mayers, New York, January 19; Abraham Walzer, Brooklyn, Max Harten, Brooklyn, and Eugene R. Marzullo, Brooklyn, January 26; Irving Gray, Brooklyn, and George N. Edson, Flushing, N. Y., Feb-

ruary 2; Charles T. Graham-Rogers, Brooklyn, John J. Wittmer, Brooklyn, Niel E. Eckelberry, New York, and a speaker to be announced, February 9, and Harry Heimann, Thomas A. Gonzales, New York, and Edmund A. Whalen, LL.B., counsel, Medical Society of the County of Kings, February 16.

OHIO

Youth Health Program Resumed on Smaller Scale.—The NYA health program in Ohio will be resumed on a smaller scale through adjustments made by local officials, the state medical journal reports. A reduction in the allocation of funds to the project was responsible for a recent curtailment of the program. Under the new set up a reduction will be made in the number of areas of the NYA in Ohio from eight to six. A health supervisor will be provided for each of the six districts with Dr. Carl A. Wilzbach, health commissioner of Cincinnati, continuing as state health consultant. Use will be made in a limited way of the physicians who had been engaged in the various counties on a per diem basis to make physical examinations of NYA youths. For the present those who will be given examinations fall into three classifications: those scheduled to go to camps and resident centers, those with obvious physical defects and those receiving shop training for subsequent employment in national defense industries.

Personal.—Dr. William E. Lower, for many years chief of staff at the Lutheran Hospital, Cleveland, was honored at a luncheon on October 16 by friends and associates of the hospital. The luncheon was planned by Dr. Norman C. Yarian, the present chief of staff, who succeeded Dr. Paul H. Krebs, a former chief of staff, he having succeeded Dr. Lower and Dr. Emanuel Klaus, who is on the staff.——Dr. Bruno Gebhard, director of the Cleveland Museum of Health and Hygiene, has been invited by Dr. Angel de la Garza Brito, dean of the School of Public Health and Hygiene, Mexico, to visit Mexico City to confer with local authorities on the establishment of a health museum.——Dr. James F. Wilson, Washington C. H., secretary of the Fayette County Medical Society, recently completed his fifteenth year as health commissioner of the county. ——Dr. James W. Fitch has retired as physician for the Home for Aged Women, Portsmouth, a service which he had donated for forty years.——Charles L. Spoler has been named executive secretary of the Scioto County Tuberculosis and Health Association. He had been formerly connected with the WPA administrative staff at Zanesville.

OREGON

Diseases of the Chest.—The second annual postgraduate session of diseases of the chest will be held at the University of Oregon Medical School, Portland, December 11-13, under the auspices of the Pacific Northwest Section of the American College of Chest Physicians and the medical school. The program has been designed as a review of present day therapy in diseases of the chest. The guest speaker will be Dr. Leo Eloesser, clinical professor of surgery, Stanford University School of Medicine, San Francisco. His subjects will be "Causes of Pulmonary Cavitation" and "Treatment of Pulmonary Cavities by Various Methods of Closed Drainage."

PENNSYLVANIA

Society News.—The Reading Eye, Ear, Nose and Throat Society was recently organized with Dr. James E. Landis as president and Dr. Paul C. Craig, secretary. Official recognition and approval was given to the new society by the American Academy of Ophthalmology and Otolaryngology at its meeting in Chicago in October. Membership will be extended by invitation to eligible physicians who hold active membership in the Berks County Medical Society and the Medical Society of the State of Pennsylvania.

Philadelphia

Annual de Schweinitz Lecture.—Dr. Harry Friedenwald, professor emeritus of ophthalmology, University of Maryland School of Medicine, Baltimore, delivered the fourth annual de Schweinitz Lecture before the Section on Ophthalmology of the College of Physicians of Philadelphia, November 19, on "The Paths of Progress of Ophthalmology."

Meeting on Medical History.—The section on medical history of the College of Physicians of Philadelphia presented the following program, November 10: Drs. Pascal F. Lucchesi, "History of Poliomyelitis"; Eugene P. Campbell, "Influenza—Past and Present," and Milton I. Rose, "Contributions of Pediatrics to Modern Public Health Philosophy."

WEST VIRGINIA

Society News.—Dr. Richard B. Cattell, Boston, addressed the Ohio County Medical Society, Wheeling, September 26, on "Diagnosis and Management of Biliary Tract Disease." Dr. Joseph H. Barach, Pittsburgh, addressed the society, October 10, on "Present Day Treatment of Diabetes and Complications." ——Dr. Martin L. Bonar, Charleston, addressed the Fayette County Medical Society, Montgomery, recently on diseases of the skin.——Dr. Dean B. Cole, Richmond, Va., addressed the Cabell County Medical Society, Huntington, September 11, on "Pneumothorax Treatment of Tuberculosis." Dr. Warren T. Vaughan, Richmond, Va., addressed the society recently on "Problems in Allergy of Interest to the General Practitioner." —— Dr. George P. Sturgis, Boston, addressed the Kanawha Medical Society, Charleston, recently on "Heart Disease in Pregnancy."

PUERTO RICO

Lectures on Tropical Medicine.—The School of Tropical Medicine of the University of Puerto Rico, San Juan, under the auspices of Columbia University, opened a series of lectures on tropical medicine, November 5, to continue until January 21. The lecturers are Dr. Ramón M. Suárez, head of the department of clinical medicine of the school; Dr. Rafael Rodriguez-Molina, assistant professor of clinical medicine, and Dr. Federico Hernández Morales, medical supervisor of the University Hospital, San Juan. The subjects covered are lymphogranuloma venereum; sprue, pellagra, ariboflavinosis and other deficiency diseases; Weil's disease; yaws, rat-bite fever; typhoid; paratyphoid A and B; amebic dysentery; tropical lymphangitis; clinical aspects of intestinal parasites; malarial fevers and blackwater fever; Schistosomiasis mansoni. *Science* reports that the following have been appointed visiting professors at the School of Tropical Medicine:

Col. Alexander T. Cooper, M. C., U. S. Army, retired, San Juan, military medicine.

Dr. Joseph O. Dean, San Juan, U. S. Public Health Service, public health practice.

David B. Dill, Ph.D., professor of industrial physiology and consulting physiologist to the hygiene department, Harvard University, Cambridge, physiology.

Dr. James A. Doull, professor of hygiene and public health, Western Reserve University School of Medicine, Cleveland, epidemiology.

Dr. Thomas H. D. Griffitts, San Juan, U. S. Public Health Service, public health.

Dr. William B. Porter, professor of medicine, Medical College of Virginia, Richmond, medicine.

William H. Taliaferro, Ph.D., dean, Division of the Biological Sciences, University of Chicago, protozoology.

GENERAL

New Radio Health Campaign.—The Federal Security Agency, the U. S. Public Health Service and the U. S. Department of Agriculture are cooperating with the Women's National Emergency Committee and the National Broadcasting Company in presenting the new fall and winter series of "Listen America," the coast to coast radio campaign for better national health, which opened on November 23. Included on the premier program was Dr. William Henry Sebrell Jr., of the Federal Security Agency, Washington, D. C.

Dr. Williams Receives Vitamin Award.—Robert R. Williams, D.Sc., chemical director of the Bell Telephone Laboratories, New York, since 1925, was presented with the annual award of the Associated Grocery Manufacturers of America, Inc., during the session in New York, November 7, in recognition of his work on the vitamins. Dr. Williams is credited with isolating Vitamin B_1. In 1938 the Chicago Section of the American Chemical Society presented the Willard Gibbs medal to Dr. Williams for "outstanding work in connection with the study and isolation of the beriberi vitamin."

Examinations for Orthoptic Technicians.—The American Orthoptic Council will conduct two examinations for orthoptic technicians in 1942. The first examination will be held in New York preceding the annual session of the American Medical Association in Atlantic City in June, and the second will be held in San Francisco preceding the meeting of the American Academy of Ophthalmology and Otolaryngology in October. One written examination will be conducted throughout the country in May, one month prior to the first examination. Applications to take this examination must be received before April 1. Only those passing the written examination will be eligible to take either of the practical and oral examinations.

Bailey K. Ashford Award.—The American Society of Tropical Medicine at its annual meeting in St. Louis, November 11, presented the Bailey K. Ashford Award in Tropical Medicine to Lloyd E. Rozeboom, Sc.D., associate in medical entomology, Johns Hopkins University School of Hygiene and Public Health, Baltimore, for proving malaria transmission in

a variety of mosquito suspected but never demonstrated to be a carrier of the disease. The award of $1,000, a bronze medal and travel expenses has been made available by Eli Lilly & Co., Indianapolis. A native of Orange City, Iowa, Dr. Rozeboom is 33 years of age. He served as assistant medical entomologist at the school of hygiene and public health from 1931 until 1934 and in this year received his D.Sc. degree at Johns Hopkins University. He has been medical entomologist at the Gorgas Memorial Laboratory, Ancon, C. Z., since 1934.

Applications for Cancer Fellowships. — The Finney-Howell Research Foundation, Inc., announces that all applications for fellowships for next year must be filed in the office of the foundation, 1211 Cathedral Street, Baltimore, by Jan. 1, 1942. Applications received after that date cannot be considered for 1942 awards, which will be made the first of March 1942. Fellowships carrying an annual stipend of $2,000 are awarded for the period of one year, with the possibility of renewal up to three years; when deemed wise by the board of directors of the foundation, special grants of limited sums may be made to support the work carried on under a fellowship. The foundation was provided for in the will of the late Dr. George Walker of Baltimore to support "research work into the cause or causes and the treatment of cancer." The will directed that the surplus income from the assets of the foundation together with the principal sum should be expended within ten years to support a number of fellowships in cancer research.

Special Society Elections. — Dr. Noel Paul Hudson, Columbus, Ohio, was chosen president-elect of the American Society of Tropical Medicine at its meeting in St. Louis conjointly with the Southern Medical Association, November 10-13, and Ernest Carroll Faust, Ph.D., New Orleans, was inducted into the presidency. Other officers include Drs. Joseph S. D'Antoni, New Orleans, vice president, and E. Harold Hinman, Wilson Dam, Ala., secretary-treasurer. Karl F. Meyer, Ph.D., of the George Williams Hooper Foundation for Medical Research, San Francisco, delivered the sixth Charles Franklin Craig Lecture on Tropical Medicine on "The Known and the Unknown in Plague." At the annual luncheon of the society Dr. Thomas T. Mackie, New York, the outgoing president, delivered his address on "Observations on the Early History of Tropical Medicine."——Dr. C. Sidney Burwell, Boston, was named president of the American Clinical and Climatological Association at its annual meeting in Boston, October 27. Other officers chosen include Drs. C. Maurice Pincoffs, Baltimore, and Francis M. Rackemann, Boston, vice presidents, and James Bordley III, Baltimore, secretary. The next annual session will be held in Princeton, N. J., Oct. 12-14, 1942.

Pharmacopeia Convention.—The board of trustees of the United States Pharmacopeial Convention announces that the adjourned meeting of the U. S. P. convention will reconvene at the Statler Hotel, Cleveland, on April 7. This meeting is in accordance with instructions given by the 1940 convention ". . . to meet at the call of the Board of Trustees to receive the report of the Committee on Constitution and By-Laws . . ." This committee consists of nine voting members of physicians, pharmacists and one representative of a governmental agency:

Dr. Allen H. Bunce, Atlanta, Ga., chairman.
Wortley F. Rudd, Ph.B., Richmond, Va.
Patrick H. Costello, Cooperstown, N. D.
Carson P. Frailey, Washington, D. C.
Dr. William A. Groat, Syracuse, N. Y.
Dr. Theodore G. Klumpp, Chicago.
Charles H. Rogers, D.Sc., Minneapolis.
Dr. Torald H. Sollmann, Cleveland.
Dr. Horatio C. Wood Jr., Philadelphia.

Ex officio members are Dr. Cary Eggleston, New York, Lewis E. Warren, M.Sc., Washington, D. C., president and secretary of the convention, respectively, and E. Fullerton Cook, Phar.D., Philadelphia, chairman of the revision committee.

Dr. DeKleine Retires as Head of Red Cross. — The retirement of Dr. William DeKleine, Washington, D. C., as director of medical and health service of the American Red Cross was recently announced. His successor is Dr. Albert S. McCown, Washington, D. C., who has been serving as assistant director since June. Dr. DeKleine's service with the American Red Cross began in 1927 during the Mississippi Valley flood relief work. Since 1928, when he joined the regular staff, he has served as medical director. Previously he had been with the Michigan State Department of Health as director of the tuberculosis division. In 1925 he directed the five year child health demonstration at Mansfield, Ohio, with funds furnished by the Red Cross. He later supervised similar demonstrations at Fargo, N. D., and Salem, Ore. He graduated at Northwestern University Medical School, Chicago, in 1906. Dr. McCown was born in Lexington, Va., in 1890 and graduated at Johns Hopkins University School of Medicine, Baltimore, in 1918. Positions he has held during his career include director of child health division, Washington State Health Department, 1934-1935; director of the division of maternal and child health, U. S. Children's Bureau, Washington, D. C., 1935-1937; deputy commissioner of health of the Michigan State Department of Health, Lansing, 1939, and director of the research and training unit, bureau of child hygiene, New York City Department of Health, 1940-1941.

Annual Meeting of Foundation for Infantile Paralysis. —The second annual medical session of the National Foundation for Infantile Paralysis was held at the New York Academy of Medicine, New York, December 3-5, with President Basil O'Connor, LL.B., presiding. A meeting of all medical advisers of the foundation, which opened the session, was followed by a program covering the activities of the committees of the foundation. At the second day's session a new feature was the presentation of prepared summaries of progress reports by the chairmen of the committees on education, nutritional research, virus research, medical publications, after-effects and epidemics and public health, participated in by grantees of the foundation. The afternoon was devoted to reports showing various means by which the foundation is combating the disease both from epidemiologic as well as from nursing and general public health points of view. The speakers were:

Dr. Felix J. Underwood, Jackson, Miss., Assistance Rendered by the National Foundation to States During Epidemic Periods.
Dr. Edward A. Piszczek, Chicago, Study of an Outbreak in West Suburban Cook County.
Jessie L. Stevenson, R.N., consultant in orthopedic nursing, National Organization for Public Health Nursing, New York, Nursing Responsibilities in Epidemics of Infantile Paralysis.
Miss Lilyan Starr, executive secretary, Georgia state chapter, Atlanta, Functions of a State Chapter of the National Foundation During Epidemic and Endemic Poliomyelitis.

The president's dinner was held in the evening with Mr. O'Connor as the speaker. Committee meetings occupied the third day's program.

LATIN AMERICA

Pediatric Scholarship. — Dr. Julio Menegfiello Rivera, assistant in the department of pediatrics of the Hospital Manuel Arriarán, will study at the Johns Hopkins University School of Medicine, Baltimore, under a scholarship from the American Academy of Pediatrics. The scholarship was awarded through the Sociedad Chilena de Pediatría to the author of the paper considered best in a competitive group.

Brazilian Ophthalmologists Form Examining Board.— The Brazilian Board of Ophthalmology was recently established with Dr. Cesario de Andrade, Rio de Janeiro, as president and Dr. Moacyr E. Alvaro, São Paulo, as secretary. The board is made up of the professors and assistant professors of ophthalmology of all the Brazilian universities and the presidents of all Brazilian societies of ophthalmology.

Medical Education in Mexico.—The theme for the annual contest sponsored by the Academia National de Medicina of Mexico is this year "Medical Education in Mexico." The contest was to close on November 30. Two channels were open for consideration: "Suggestions on Modifications Proper for the Country" and "Pharmacodynamics of Sulfanilamide and Its Derivatives." The winner of the contest will be given 100 Mexican pesos and a certificate of honor and, in addition, a number of reprints of the winning essay.

Society News.—Members of the Sociedad de Oftalmologia de Litoral were guests of the Sociedad de Oftalmologia de Cordoba at a recent meeting with the following speakers: Drs. Carlos Weskamp, professor of ophthalmology in the faculties of medicine of Rosario and the National University of Litoral, Argentina, on "Observations on Serous Chorioretinitis of the Macula"; Juan M. Vila Ortiz, assistant professor of ophthalmology and ophthalmologist of the department of labor of Rosario Province, Argentina, "Considerations of Medico-legal Expert Testimony," and Isaac Cotlier, substitute professor of ophthalmology of the Faculty of Medicine of the National University of Litoral, Argentina, "The Stenopaic Macular Perforations in Examinations for Refraction."

CORRECTION

Stipulations.—In the Bureau of Investigation department of THE JOURNAL for November 15, page 1727, appeared an abstract stating that the Federal Trade Commission had announced a stipulation with one Abram R. Canter of Pittsburgh, who sold "certain corsets and girdles known by the trade name 'Camp' and other so-called 'reducing girdles'" (quoted from the stipulation). This dealer is no part of the S. H. Camp & Company, and the latter firm reports that it markets no garment under the name Camp "reducing girdle."

Foreign Letters

LONDON

(From Our Regular Correspondent)

Oct. 18, 1941.

International Conference of Scientists

The opening of a conference of scientists in London called by the British Association for the Advancement of Science has been described in a previous letter. The principles adopted by the council were announced. Intellectual freedom is held to be an essential condition of human progress. The special responsibility of scientists in the struggle to maintain intellectual liberty is asserted. The war now devastating the world involves an age old conflict of ideas. Liberal minds of the last generation were convinced that the battle for freedom of thought was finally won; yet once again this conviction is being violently assailed.

A recorded speech from General Smuts, a past president of the association, was broadcast from Capetown. He said that science was the greatest torch which the spirit of man had kindled in the modern world and that nothing—not even in this dark hour—should be allowed to interrupt its kindly light. It was fitting that this conference should be held in Britain, the mother of modern democracy. Science and democracy stood or fell together. The whole ethical basis of our western way of life was challenged. The "new order" was a return to the old slavery with the Gestapo added. In particular the proud position of science was challenged and degraded until it became no better than propaganda for myths and beliefs long discarded.

MAN IN DANGER OF EXTINCTION

Mr. H. G. Wells, who presided over a section on Science and the World Mind, said that what he would call the world mind was not really a coordinated mind at all: it was a gabble of unheeded and inconsecutive shoutings. If some vast superhuman intelligence was to ask "What is Man thinking now?" the answer would be "He is in fever and is delirious. He has muttered all sorts of things in the past, but now he is waking up very painfully and he talks louder." Unless man adapted himself to changing circumstances he might become extinct. Could he do this with sufficient rapidity to become a progressive superhomo or would he become one of a series of degenerating subhuman species or so fail as to end altogether? The records of the past were against the idea of any survival whatever of the human strain. We intellectual workers have to decide whether we are to be slaves and do what we are told by our masters the gangsters and profiteers or take our rightful place as servant masters of the world. We have the makings of a great international for pulling our scatterbrained world into a sane mentality. To have peace on the earth henceforth there must be federal control of international transport and a fundamental declaration of human rights, ensuring for all a fair participation in the resources of our planet. We needed a common language and a world encyclopedia.

Prof. Julius Lowy, formerly of Prague University, said that the health services of the European countries would not be equal to the great demands which would be made on them after the war. He proposed that the natural resources of Europe, such as sunlight, sea and mountain air, climatic factors and medicinal springs, should be used more systematically. A body should be appointed to draw up a scheme for their international use and to consider financial schemes for putting this into practice.

Mr. Allen of the American Red Cross spoke of the help his organization had given to France since the German occupation. They found the hospitals completely denuded. The Germans had taken all the equipment and supplies. The French were left to set up hospitals in churches and schools and for their operating rooms used instruments from hardware stores.

Germany Violates International Convention for Repatriation of Sick and Wounded Soldiers

The conditions governing repatriation of sick and wounded prisoners of war are clearly stated in article 68 of the International Convention, to which Germany is a signatory. It runs as follows: "Belligerents shall be required to send back to their own country without regard to rank or numbers, after rendering them in a fit condition for transport, prisoners of war who are seriously ill or seriously wounded." Germany has now added a violation of this undertaking to the violations of treaties perpetrated by her in pursuit of her objects. Proposals for repatriation have been under discussion through the protecting power for many months, but the two governments were unable to reach agreement on the question of route and mode of transport. But on September 1 the British government received a proposal from the German government, through the Swiss legation, suggesting that sick and wounded should be repatriated in a British hospital ship through channel ports. This suggestion had been made by the British government several months before and rejected by Germany. The British government now accepted the proposal. On September 9 it received through the American embassy a message from the German government stating that there were twelve hundred British prisoners of war approved for repatriation by the mixed medical commission in Germany. The German government expressed the hope that sick and over age civil internees might also be repatriated. It also said that as we were sending only one hundred and fifty German prisoners of war our government might consider its gain in the exchange and send some civilians; also that we might fill available space in the hospital ships with German civilian women and children and men not of military age. Our government agreed to this and offered to send as a token of its intention a first batch of sixty German civilians. Then on October 2 the German government replied that "in view of the unsatisfactory attitude" of our government it would agree only to a limited exchange on a numerical basis. It was evident that it was attempting at the last moment to overthrow the previously agreed basis for repatriation. In view of this flagrant breach of faith our government reluctantly canceled the sailing of the ships. If it accepted the German change, the bulk of the British wounded would have lost their chance of repatriation. This breach of faith violates the International Convention, which states that repatriation shall take place "without regard to rank or numbers."

American Gift of Surgical Instruments

A gift of surgical instruments from the Columbia Medical Center of New York to the Charing Cross Hospital, London, was handed over by Sir Alfred Webb-Johnson, president of the Royal College of Surgeons. Mr. Lennox Ross Broster, a surgeon of the hospital, visited the United States this year to deliver two of the American society's official lectures. In making the presentation the president said that Mr. Broster's mission had been an enormous success. In addition to upholding the honor of British surgery he had made our American friends realize our gratitude and need. As a result, the Charing Cross Hospital had received this splendid gift of instruments, which came at a most opportune time, when the hospital was opening a new operating room. Mr. Philip Inman, chairman of the hospital, expressed the gratitude to the governors of the Columbia Medical Center.

SWITZERLAND

(From Our Regular Correspondent)

Oct. 15, 1941.

Investigation of Causes of Goiter

The question of the causes of goiter was discussed by Prof. Dr. J. U. Duerst before the Swiss goiter commission on the basis of a recent book, which summarizes investigations that cover a period of thirty-two years. These studies were begun at the suggestion of the late surgeon Professor de Quervain, who had studied the thyroid throughout his life. The initial investigations concerned the first appearance of the thyroid gland in fishes. The anatomists had disputed for decades whether the thyroid belongs to the respiratory or the digestive system. Duerst demonstrated that the thyroid, like the lung and the thymus, is an organ of the branchial canal, which is formed from remnants of the branchial clefts and thus must belong to the respiratory system. He was able to demonstrate in forty-five species of fish and in more than two hundred individuals that the thyroid and the thymus are closely connected with the gas exchange in the water. Great differences exist between the fish that live in the well oxygenated upper layers of water and the fish that inhabit the deeper strata in which the water has a lower oxygen and a higher carbon dioxide content. In surface fish the thyroid and thymus disappear after puberty, whereas in deep water fish the thyroid persists often into an advanced age and the thymus often shows proliferation at the time of puberty and is transformed into a reservoir for lymphocytes. That the thyroid as well as the thymus belongs to the gas exchange system has been corroborated in reptiles and in birds by the fact that the thyroid is attached tightly to the carotid and grows bilaterally, to the right and left of the heart, into the thorax; it is not connected, as was asserted previously, with the larynx of birds. Up to this developmental level in the animal kingdom the thyroids that do occur represent colloid glands; in old fishes and in birds parenchymatous forms seem to exist occasionally, but only in diseased animals. The colloid form is the normal one in these animals. Both forms, that is, colloidal and parenchymatous glands, appear for the first time in mammals. In these animals diet exerts a great influence; it could be demonstrated that a diet with "a high acid content" effects an increase of the parenchymatous glands; the same takes place as a result of internal disturbances of the acid-base equilibrium of the tissues. In the presence of alkalosis, however, the colloid thyroid was always preserved, and under certain conditions it developed into a colloid goiter.

Investigations on marmots and hedgehogs led to the conclusion that in all types of animals the thymus is concerned chiefly with the neutralization of acids; the thyroid, on the other hand, with the regulation of the oxygen supply. The relation between oxygenation of the respiratory air and the size of the thyroid was demonstrated by Duerst in correlation computation on cattle.

The etiologic factors in goiter in man were investigated on the basis of these investigations. Studies on gas metabolism disclosed two fundamental errors in the prevailing conception. Detailed analyses disclosed that an increase of 100 meters in altitude reduced the weight of the oxygen by about 1 per cent and that expansion due to heat reduces the weight by 0.4 per cent for each degree centigrade. For this reason the air in high mountains and that in tropical regions have almost identical oxygen deficiencies. At 300 meters above sea level and at an average temperature of 15 C. (59 F.), about 10 per cent of the normal sea level oxygen supply is missing. The hitherto accepted view that oxygen deficiency develops only above 3,000 meters altitude is absolutely erroneous on the basis of these investigations. A tendency to goiter formation is already evident in the presence of a 10 per cent oxygen weight loss. An entirely new discovery was made in the course of thousands of air analyses, namely that carbon dioxide derives chiefly from the respiratory activity of the plant world. Assimilation in the green plant does not take place automatically as long as there is light but is absolutely elective, depending on adaptation (sun plants and shadow plants). Forest trees, for instance, assimilate, as a rule, for only about six hours daily, and they produce carbon dioxide by exhalation for eighteen hours. The heavy carbon dioxide that is produced at night sinks down, and on inclining terrain or by water attraction it produces currents and even carbon dioxide lakes. It was newly discovered that a chemical affinity exists between water and carbon dioxide, so that cold water, particularly if it flows rapidly, carries with it by its power of attraction such carbon dioxide currents and puts them into accelerated movement. This explains many of the edemic goiter regions which are found in river valleys, delta regions, swamps and so on, in which stagnant water, when it becomes warmer, again discharges carbon dioxide if calcium formation has not taken place. Thus goiters are prevalent in some heavily forested regions of Russia, Canada and North America.

Other climatic factors play a part, particularly fog, in which the carbon dioxide always increases. Winds from large forests, which frequently have continuously the same direction as the nocturnal mountain winds, often increase the carbon dioxide content in the lowest air layers and thus make breathing difficult and promote goiter formation.

Besides these chief causes of goiter formation the nutritional metabolism plays a part, particularly the modification of the acid-base equilibrium in the direction of a tissue acidosis; for instance, by a meat or sugar diet. Sugar has an elective affinity for potassium. By extensive experiments on domestic animals, Duerst found that potassium, even in the form of bicarbonate, is capable of dissolving the colloid in the goitrous colloid gland, whereas the calcium salts cause stasis and hardening of the colloid. This explains the surprising results obtained by Webster, who was able to produce parenchymatous goiters in rabbits only during the winter by feeding them with various types of cabbage, whereas during summer the same diet produced normal glands; this is explained by the fact that in winter the potassium and acid content of the various types of cabbage is especially high. Nutrition and particularly mineral substances are of great significance in the pathogenesis of goiter.

These studies also demonstrate the importance of minerals in the soil, which was stressed repeatedly by the Swiss surgeon Eugen Bircher.

Duerst regards the nature of the soil and water and the topographic location of a community as the chief reasons for the localization of endemic goiter regions. The carbon dioxide content plays a part, particularly if the carbon dioxide currents pass human habitations. It is of interest that in villages in which goiter is endemic many houses remain free from goiter whenever the ventilation is good and the house is not in the carbon dioxide current.

Duerst concurs with the observations of Eugster as regards the heredity of goiters. A genotypic heredity is excluded, but a transmission of the existing biochemical metabolic milieu is possible and, in view of the continuation of the causal circumstances, goiters and even cretinism continue to develop. It is also proved that a specific infection cannot exist. Topography, housing, hygiene and the nutritional factors have to be considered in the prophylaxis. As regards treatment, in addition to iodine, potassium bicarbonate can be used in colloid goiters. For toxic goiters a carbon dioxide reduction of about 15 per cent is recommended; that is, the persons in question should live at an altitude 1,500 meters above that to which they are accustomed. Conversely, in colloid goiter the regular daily inhalation of oxygen and potassium medication have a favorable effect; also dietetic measures that induce acidosis.

Deaths

Percy Lancelot Jones ✦ Colonel, United States Army, retired, Erie, Pa.; University of Tennessee Medical Department, Nashville, Tenn., 1897; veteran of the Spanish-American War; on July 10, 1903, was appointed a first lieutenant in the medical corps of the United States Army and was sent to the Army Medical School, graduating in 1904; was advanced through the grades, given a temporary promotion to colonel in the World War and reached that permanent grade on July 10, 1929; retired on his own request on Oct. 30, 1931; fellow of the American College of Surgeons; aged 66; medical director of the Hamot Hospital, where he died, August 9, of carcinoma of the larynx.

Emerson Megrail ✦ Cleveland; Western Reserve University School of Medicine, Cleveland, 1915; associate professor of hygiene and bacteriology at his alma mater and member of its teaching staff since 1919; consultant laboratory director of the division of health of Cleveland; served in France during the World War as a captain in the medical corps; member of the Society of Bacteriologists; fellow of the American Public Health Association; aged 51; died, October 21, of coronary thrombosis.

Elmon Reuben Johnson ✦ Quincy, Mass.; Boston University School of Medicine, 1895; clinical instructor in laryngology at his alma mater from 1921 to 1928 and instructor in clinical laryngology and rhinology, 1928-1929; fellow of the American College of Surgeons; formerly served on the staff of the Massachusetts Memorial Hospital, Boston; otolaryngologist, Quincy City Hospital; aged 70; died, October 30, of cerebral hemorrhage and arteriosclerosis.

Harold Franklin Taylor, Hartford, Conn.; University of Vermont College of Medicine, Burlington, 1917; member of the Vermont State Medical Association; formerly assistant professor of medicine at his alma mater; served during the World War; associate medical director of the Aetna Life Insurance Company; aged 51; died, October 22.

Otto Joachim ✦ New Orleans; Memphis (Tenn.) Hospital Medical College, 1883; member of the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; consultant in otolaryngology, Baptist and Orleans Tuberculosis hospitals, Milne Home and Touro Infirmary; aged 77; died, October 27.

Eugene Wilson Skelton, Brooklyn; Long Island College Hospital, Brooklyn, 1901; member of the Medical Society of the State of New York; fellow of the American College of Surgeons; surgeon emeritus, Norwegian Hospital; president of the Baptist Home; aged 70; died, October 30, in the Methodist Hospital of cystic kidney and uremia.

William C. Schultz, Waynesboro, Pa.; Jefferson Medical College of Philadelphia, 1895; member of the Medical Society of the State of Pennsylvania; past president of the Franklin County Medical Society; aged 72; on the staff of the Waynesboro Hospital, where he died, October 29, of nephritis.

Charles Wardell Heywood ✦ Utica, N. Y.; Northwestern University Medical School, Chicago, 1896; on the staff of St. Elizabeth Hospital; at one time on the staff of the Cook County Hospital and Hospital of St. Anthony De Padua, Chicago; aged 70; died, October 31, of coronary thrombosis.

Howard William Salisbury, Dearborn, Mich., University of Michigan Medical School, Ann Arbor, 1927; member of the Michigan State Medical Society; on the staff of the Emergency Hospital of the Ford Motor Company; aged 40; died, October 19, in the Henry Ford Hospital, Detroit.

John Freeman Summerville, Monroe, Pa.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1881; member of the Medical Society of the State of Pennsylvania; past president and secretary of the Clarion County Medical Society; aged 84; died, October 25.

Anthony Thomas Weber ✦ Chicago; National Medical University, Chicago, 1907; veteran of the Spanish-American and World wars; formerly on the staffs of the Veterans Administration Facility in Hines, Ill., and Tucson, Ariz.; aged 64; died in October of coronary occlusion.

Alexander Bradfield, Tillamook, Ore.; Detroit College of Medicine and Surgery, 1933; member of the Oregon State Medical Society; county health officer; aged 34; died, October 28, in St. Vincent's Hospital, Portland, of agranulocytic angina following the use of dinitrophenol.

James M. Marsh, Elkhorn, Wis.; New York Homeopathic Medical College and Hospital, New York, 1890; past president of the Walworth County Medical Society; for many years city public health officer; aged 79; died, October 31, in the Walworth County Hospital of uremia.

Morrow Beach Wilson, National Military Home, Ohio; Starling Medical College, Columbus, 1895; veteran of the Spanish-American War; aged 70; died, October 24, in the Veterans Administration Facility, Dayton, of arteriosclerosis, heart disease and diabetes mellitus.

Clyde Frederick Zapf, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1918; was on the staffs of the Women's Homeopathic Hospital, Salvation Army Home and Hospital and the Hahnemann Hospital; aged 45; died, October 23, of angina pectoris.

Theodore Ora Morris, Los Angeles; Central College of Physicians and Surgeons, Indianapolis, 1904; served during the World War; on the staff of the Veterans Administration Facility, West Los Angeles; aged 63; died, October 19, in San Diego of coronary occlusion.

Edward Bailey Beasley, Ruxton, Md.; Johns Hopkins University School of Medicine, Baltimore, 1906; received the degree of doctor of public health from Harvard University, Boston, in 1911; aged 59; died, August 30, of coronary occlusion and arteriosclerosis.

Carroll Deane Smith, Paterson, N. J.; University of Texas School of Medicine, Galveston, 1925; member of the Medical Society of New Jersey and the National Gastroenterological Association; aged 42; died, October 28, at the Mount Sinai Hospital, New York.

Lucius Frank Laverty Jr. ✦ Bay City, Mich.; Harvard Medical School, Boston, 1927; served in the Navy during the World War; on the staffs of the Bay City General Hospital and the Mercy Hospital; aged 46; was killed, October 30, in an automobile accident.

James Homer Butler, Lincoln, Ill.; Missouri Medical College, St. Louis, 1899; member of the Illinois State Medical Society; on the staffs of the Evangelical Deaconess Hospital and St. Clara's Hospital; aged 66; died, October 31, of carcinoma of the sigmoid.

Irvin Cameron Stayer, Woodbury, Pa.; Medico-Chirurgical College of Philadelphia, 1901; member of the Medical Society of the State of Pennsylvania; for many years member of the board of education; bank president; aged 68; died, October 24, of lymphosarcoma.

Jarold Elting Kemp, Baltimore; Johns Hopkins University School of Medicine, Baltimore, 1921; member of the Central Society for Clinical Research; on the staff of the Johns Hopkins Hospital; aged 43; died, October 19, of acute coronary occlusion.

John Michael Leonard ✦ Fall River, Mass.; College of Physicians and Surgeons, Baltimore, 1900; for many years president of the staff of St. Anne's Hospital; medical inspector of public schools; aged 65; died, October 26, of carcinoma of the rectum.

Floyd Lamar Abernethy, Foley, Ala.; University of Alabama School of Medicine, University, 1916; member of the Medical Association of the State of Alabama; served during the World War; aged 50; died, October 29, of coronary occlusion.

Benjamin Eugene Sanborn, Manchester, N. H.; Dartmouth Medical School, Hanover, 1911; member of the New Hampshire Medical Society; on the staff of the Elliot Hospital; aged 56; died, October 3, of carcinoma of the rectum and liver.

Wilmington Eldrich Shallowhorne, Kerrville, Texas; Flint Medical College of New Orleans University, New Orleans, 1906; aged 60; on the staff of the Kerrville State Hospital, where he died, October 18, of chronic interstitial nephritis.

Frank Calhoon Smith, Washington, D. C.; Memphis (Tenn.) Hospital Medical College, 1896; served during the World War; formerly on the staff of the Veterans Administration; aged 68; died, July 8, in the Veterans Administration Hospital.

James G. Trant, Richmond, Va.; Medical College of Virginia, Richmond, 1906; member of the Medical Society of Virginia; for many years medical examiner for the city public school system; aged 60; died, October 29, of cerebral hemorrhage.

Joseph Collier Ray, Whitakers, N. C.; University College of Medicine, Richmond, 1909; member of the Medical Society of the State of North Carolina; aged 58; died, October 29, in the Rocky Mount (N. C.) Sanitarium of coronary heart disease.

Ray Wallace Moe, Peekskill, N. Y.; College of Physicians and Surgeons, Baltimore, 1903; past president of the board of the Peekskill Hospital; aged 61; died, October 27, of carcinoma of the lung and rheumatoid arthritis.

Lawson Henry Recher, Morocco, Ind.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1879; member of the Indiana Medical Association; aged 85; died, October 11, of arteriosclerosis.

Joseph W. Maddox, Hillwood, Ala.; University of Tennessee Medical Department, Nashville, 1900; member of the Medical Association of the State of Alabama; aged 69; died, October 31, of coronary occlusion.

Louis James Loughlin, Carberry, Man., Canada; University of Manitoba Faculty of Medicine, Winnipeg, 1927; aged 39; died, October 31, in the Grace Hospital, Winnipeg, of gastric hemorrhage and pleurisy.

James T. Leigh, Du Quoin, Ill.; Missouri Medical College, St. Louis, 1882; member of the Illinois State Medical Society; on the staff of the Marshall Browning Hospital; aged 83; died, October 30, of senility.

Everett Lamont Bradley ✠ Pontiac, Mich.; George Washington University School of Medicine, Washington, D. C., 1920; aged 46; died, October 30, in the Pontiac General Hospital of acute hemorrhagic pancreatitis.

Edward P. Condon, Spokane, Wash.; John A. Creighton Medical College, Omaha, 1910; aged 56; died, October 23, of cerebral hemorrhage, pneumonia, coronary thrombosis and arteriosclerosis.

John Todd, Newport, Ky.; Medical College of Ohio, Cincinnati, 1900; member of the Kentucky State Medical Association; formerly health officer; aged 64; died, October 21, of heart disease.

McClellan Wilson, McAlester, Okla.; Ensworth Medical College, St. Joseph, Mo., 1894; member of the Oklahoma State Medical Association; aged 77; died, October 15, of cerebral hemorrhage.

Leonard H. Jacobsen ✠ Seattle; University of Minnesota College of Medicine and Surgery, Minneapolis, 1905; aged 60; died, October 4, of recurring coronary thrombosis and cholecystitis.

James Brown McClendon, Birmingham, Ala.; Rush Medical College, Chicago, 1933; member of the Medical Association of the State of Alabama; aged 33; died, October 29, of heart disease.

Horace Fleckenstine ✠ Newportville, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1896; aged 73; died, October 31, of diabetes mellitus and cardiorenal disease.

John Milton Boyd ✠ Washington C. H., Ohio; Starling Medical College, Columbus, 1904; aged 82; died, October 28, in the White Cross Hospital, Columbus, of cerebral hemorrhage.

Bela David Thomas, Dallas, Texas; Kansas City (Mo.) College of Medicine and Surgery, 1917; served during the World War; aged 56; died, October 12, of coronary occlusion.

Jacob A. Wagner, Bland, Va.; Medical College of Virginia, Richmond, 1901; for many years superintendent of the county schools; aged 80; died, October 15, of pernicious anemia.

Charles Herbert Sangster, Buffalo; University of Buffalo School of Medicine, 1895; for many years principal of several city schools; aged 82; died, October 20, of myocarditis.

Clarence Harmon Ellis, Phoenix, Ariz.; Homeopathic Hospital College, Cleveland, 1887; aged 81; died, October 13, in the Good Samaritan Hospital of coronary occlusion.

Ralph Dwight Quillen, Baltimore; College of Physicians and Surgeons, Baltimore, 1909; aged 57; died, October 20, in a local hospital of arteriosclerosis and heart disease.

Alfred Daudelin, Nashua, N. H.; Baltimore Medical College, 1908; member of the New Hampshire Medical Society; aged 63; died, September 13, of cardiorenal disease.

Thomas Art Smith, Charlotte, N. C.; North Carolina Medical College, Charlotte, 1917; aged 51; died, October 18, in the Mercy Hospital of coronary thrombosis.

Theodore Lincoln Hazard, Iowa City, Iowa; University of Michigan Homeopathic Medical School, Ann Arbor, 1883; aged 81; died, October 31, of heart disease.

Wyatt S. Miles, Crockett, Texas; Medical Department of Tulane University of Louisiana, New Orleans, 1890; aged 75; died, October 9, of cerebral hemorrhage.

George H. Craft, Newark, N. Y.; University of Buffalo School of Medicine, 1896; aged 67; died, September 1, of cerebral hemorrhage and arteriosclerosis.

Charles Clinton Cooley, Chicago; Jenner Medical College, Chicago, 1915; also a dentist; aged 60; died, October 12, in Warrenville, Ill., of coronary thrombosis.

Jane Kelsey Todd, Portland, Ore.; Northwestern University Woman's Medical School, Chicago, 1898; aged 73; died, October 3, of myocarditis and pneumonia.

John Ignatius McGonigle, Oklahoma City; Beaumont Hospital Medical College, St. Louis, 1901; aged 75; died, October 10, of coronary thrombosis.

Eugene A. Woods, Sarasota, Fla.; University Medical College of Kansas City, Mo., 1898; aged 65; died, September 27, of fibroid pulmonary tuberculosis.

John A. Rickert ✠ Allegan, Mich.; Detroit College of Medicine and Surgery, 1921; aged 46; died, October 9, in Detroit of chronic myocarditis.

James Bones Wright, Augusta, Ga.; University of Georgia Medical Department, Augusta, 1888; aged 79; died, October 8, of cardiovascular renal disease.

William Ladell Edgar ✠ Athol, Mass.; Hahnemann Medical College and Hospital of Philadelphia, 1894; aged 68; died, October 11, of endocarditis.

Albert D. Mock, Marion, Ind.; Curtis Physio-Medical Institute, Marion, 1888; aged 76; died, October 24, of myocarditis and arteriosclerosis.

John B. Kersey, Cincinnati; Pulte Medical College, Homeopathic, Cincinnati, 1885; aged 79; died, October 23, of carcinoma of the intestine.

H. W. Glasscock, Smithfield, Ky.; University of Louisville (Ky.) Medical Department, 1875; aged 85; died, October 10, of coronary occlusion.

Andrew Charles Callahan, Buffalo; Ohio Medical University, Columbus, 1905; aged 60; died, October 11, of myocarditis and coronary sclerosis.

William S. Frye, New Kensington, Pa.; Physio-Medical College of Indiana, Indianapolis, 1882; aged 82; died, October 30, of arteriosclerosis.

Otto L. Von der Au, St. Louis; Beaumont Hospital Medical College, St. Louis, 1892; aged 71; died, October 4, of cerebral hemorrhage.

Charles Joseph Sager, Woodstock, Va.; Medical College of Virginia, Richmond, 1898; aged 68; died, October 24, of cerebral hemorrhage.

Vernon Leslie Litsinger, Farnham, Va.; Maryland Medical College, Baltimore, 1912; aged 58; died, October 14, of heart disease.

William Wylie Nasmyth, Sylvan Lake, Alta., Canada; Trinity Medical College, Toronto, Ont., 1889; aged 75; died, September 6.

Homer Burton Curtis, Kansas City, Mo.; Barnes Medical College, St. Louis, 1901; aged 69; died, October 2, of cerebral hemorrhage.

Frank Joseph Schwarz ✠ St. Louis; Bennett Medical College, Chicago, 1915; aged 64; died, October 28, of bronchopneumonia.

Charles Cornelius Langsdorf, Seffner, Fla.; Bellevue Hospital Medical College, New York, 1894; aged 73; died, October 7.

George Hal Williamson, Port Austin, Mich.; Chicago College of Medicine and Surgery, 1913; aged 56; died, October 18.

Joseph Watkins Yard, Long Beach, Calif.; Bellevue Hospital Medical College, New York, 1884; aged 83; died, October 27.

George Allan Anderson, Calgary, Alta., Canada; Trinity Medical College, Toronto, Ont., 1900; aged 71; died, September 27.

Michael Krantz ✠ Boston; Middlesex University School of Medicine, Waltham, Mass., 1921; aged 59; died, September 4.

James Edwin Blickensderfer, Lebanon, Mo.; Barnes Medical College, St. Louis, 1896; aged 74; died, October 19.

Claxton Perry Binford, Huntsville, Ala.; Meharry Medical College, Nashville, Tenn., 1927; aged 41; died, October 3.

James Guard Fisk, Venice, Calif.; Medical College of Indiana, Indianapolis, 1892; aged 73; died in September.

Correspondence

TRANSFUSION OF BLOOD AND BLOOD SUBSTITUTES

To the Editor:—In the editorial "Transfusion of Blood and of Blood Substitutes" (The Journal, Nov. 8, 1941, p. 1627) you state that "Hustin of Belgium proposed in 1914 a method of collecting blood in a vessel containing an equal amount of a solution of 5 per cent dextrose in 9 per cent of sodium chloride and sodium citrate in the amount of 20 cc. for each hundred cubic centimeters of blood. The method was used on a rather large scale by the Entente forces during World War I."

It is correct that Hustin was the first to try sodium citrate in blood transfusion. However, he thought that in order to prevent coagulation it was necessary to use strongly diluted blood. He mixed (Note sur une nouvelle methode de transfusion, *Bull. Soc. roy. d. Sc. méd. de Bruxelles* **72**:104 [April 6] 1914) 150 cc. of blood with 150 cc. of a dextrose-sodium citrate solution. Thus for a blood transfusion of average size (500 cc.) an equal amount (500 cc.) of dextrose-sodium citrate solution had to be added. It is perfectly clear that blood in such strong dilution loses the vital qualities of pure blood. Furthermore, the introduction of a quart of fluid might overtax the circulation.

As far back as 1918 Hédon (Note complémentaire sur la transfusion du sang citraté, *Presse méd.* **26**:57 [Jan. 31] 1918) pointed out that "Hustin's method was really an infusion of a strongly diluted blood mixed with sodium citrate and dextrose."

The citrate method of blood transfusion became a practical method and was used, as you state in your editorial, on a rather large scale in World War I, when Agote (Nuevo procédimiento para la transfusion del sangre, *An. Inst. Modelo de clín. méd.*, January 1915) and I (A New and Greatly Simplified Method of Blood Transfusion, *New York M. Rec.* **87**:141 [Jan. 23] 1915) independently and contemporaneously showed that addition of a small quantity of citrate solution was sufficient to prevent coagulation of the blood. I used 50 cc. of a 2.5 per cent solution for 450 cc. of blood and Agote used 5 cc. of a 25 per cent stock solution.

Neither Agote nor I knew of Hustin's work when we published the description of our methods. The World War had started in August 1914 and interrupted exchange of medical literature between Europe and this country.

Hustin's work presented an interesting experiment but not a solution of the problem. For this reason it cannot deserve more than a certain historical interest.

Richard Lewisohn, M.D., New York.

"THERE IS NOTHING PHYSICALLY THE MATTER" (CONTINUED)

To the Editor:—Dr. Roy Grinker's communication in The Journal, October 18, deserves wide attention and comment. The physician's attitude toward patients with nervous symptoms generally reflects discredit on the medical profession. The reasons for that attitude should give us pause.

Most physicians have little difficulty in recognizing anxiety states and the various organ neuroses. Even when the diagnosis is made by the exclusion method alone, our correct percentages are satisfactorily high. However, when a diagnosis of psychoneurosis has been established there seems often to be little advice that can be given which is of real or lasting benefit. The patient is usually left more confused than ever, for he is frequently told, against his own better judgment, that "there is nothing physically the matter" or "nothing seriously wrong." Both of these considered opinions are erroneous. Nervous disorders are invariably accompanied by measurable disturbances of physiology. At first functional and reversible, these disturbances readily persist and cause structural organic diseases that are demonstrable by physical and laboratory examinations.

As physicians, we dislike and dismiss "neurotics" because we are not equipped by instruction or experience to treat them. They often represent our failures: the skeletons in our medical closets. It takes much time to listen to their many complaints, patience to brook their "resistance" and a very definite plan to combat their aggressiveness and lead them away from an emotional to a rational and realistic outlook on life. Yet these hardships are a part and parcel of our heritage as physicians. If we cannot find time or heart for this phase of our work, the least that we can do is to recognize our responsibility and reputation as physicians and instruct the patient as to where advice may be found.

Medicine knows no limits to its objectives; those objectives are to improve the total health and welfare of all the people. Neither in their own nor in the public's eyes do physicians restrict their capacity to give generous advice. The healing of the sick is a science that can exclude no part of the body. Must it continue to be said of us after twenty-four hundred years of science that "it is the great error of our day in the treatment of the human body that physicians separate the soul from the body"? So neglectful and indifferent an attitude will deprive us of that confidence which our many sacrifices have shown us to deserve and deny hope to many sick people who may reasonably expect hope from rational and courageous treatment.

Andrew D. Hart Jr., M.D., Charlottesville, Va.

HEALTH OF SHARECROPPERS

To the Editor:—The article in The Journal, July 5, by Dr. J. W. Thompson on the clinical status of a group of Negro sharecroppers provokes discussion. An evaluation of the health of Negro sharecroppers is made on the basis of a sample of 24 subjects on whom a history was taken and a physical examination made. The data gleaned by the author seemed to indicate a dangerous state. Yet he concludes that he doubts that the "Negro sharecroppers are apt to be in a lamentable state of ill health." Finally he states that all but 1 were in good general condition and not far below the excellence found in a group of Harvard students—who did not show a single abnormal finding.

I recapitulate Dr. Thompson's observations: pyorrhea in 50 per cent, syphilis in 8 per cent, pellagra in 4 per cent, pulmonary signs—not investigated—in 8 per cent, possible heart disease in 4 per cent, gonorrhea in 63 per cent and gonorrheal arthritis in 12 per cent.

Infant mortality figures were five times as great as those among white persons. The group was 10 per cent under ideal weight and 4.5 per cent under ideal height.

As a supererogatory gesture the author quotes another piece of research to show that Negroes can endure hard labor better than the white race.

A sincere interest in the health of Negro sharecroppers demands an excellence of medical research.

Joseph M. Krimsky, M.D., Brooklyn.

[This letter was referred to Dr. John W. Thompson, Toronto, who replies:]

To the Editor:—The two serious diseases which were found prevalent in the histories of the Negro sharecroppers were gonorrhea and malaria. All these subjects had been under medical care and, as far as one could determine, had been cured. That they had been adequately treated and had recovered is not deplorable. Two subjects showed positive Wassermann reactions, and 1 of these was not a sharecropper. However, accept-

ing the figure of 8 per cent, Roberts and Williams (*South. M. J.* **30**:458 [May] 1937) report an incidence of 11.7 per cent in the white population of Gibson County in Tennessee, and Usilton (*Ven. Dis. Inform.* **16**:147 [May] 1935) estimates that 8 per cent of males from 20 to 30 years of age contract syphilis. I cannot regret the fact that the figure for the Negroes is, if anything, lower than that for the white population. That the cardiac and respiratory signs found on clinical examination were without significance was shown by the excellent ability of these subjects to transport oxygen—a performance which is quite incompatible with either cardiac or respiratory disease. That the infant mortality was five times as great as that found in the "control" series is indeed a large difference but scarcely one which would necessarily damage the health of the surviving members to which the article had reference. As to weight, it would be more correct, in all probability, to state that the Harvard students were 10 per cent above rather than that the Negro was 10 per cent under ideal weight; the difference in weights is what one might expect between groups composed of sedentary individuals, on the one hand, and physically active individuals on the other. I can say nothing with reference to the difference of 8 cm. in the relative heights other than to suggest as an explanation a difference in anthropologic characteristics and to confess ignorance as to its diagnostic significance. In order to determine the physical fitness of an individual there is obviously no better way than to measure his capacity to perform a task whose standard of execution is known to be commensurate with physical fitness. This was done with the Negro whose performance would be the envy of those desirous of being fit. If reference to this fact is looked on as a "supererogatory gesture," its significance has not been understood.

JOHN W. THOMPSON, M.B., University of Toronto.

DIETARY HEALING OF DENTAL CARIES

To the Editor:—In THE JOURNAL, September 27, the editorial on dietary healing of dental caries seems to be misleading and not in conformity with the article from which the information was secured. To quote from *Science* of June 27, 1941: "The dentine had a sclerotic appearance and beneath every place where the outer part of the tooth had been subjected to attack a new, thick layer of secondary dentine had been laid down. . . ." This statement is quite different from the one made in the editorial—"the exposed tooth was found covered by a thick layer of secondary dentine more or less filling the earlier cavity."

HOUGHTON HOLLIDAY, New York.
Associate Dean, School of Dental and Oral Surgery of Columbia University.

To the Editor:—In the September 27 issue, page 1099, appears an editorial entitled "Dietary Healing of Dental Caries." The opinions clearly reveal that some one has disseminated misleading interpretations of a physiologic process previously described.

A careful reading of Sognnaes' paper in *Science* reveals a tendency on the part of the author to wishful thinking when he applies the term reparative process to what is obviously the deposition of secondary dentin. The person who wrote the editorial certainly went Sognnaes one better with his statement that secondary dentin more or less filled the earlier cavity. Secondary dentin forms in all rats' teeth subject to wear and frequently in rats' teeth that are not subject to wear, regardless of the presence or absence of dental caries. Hoffman and Schour (*Am. J. Orthodontics* **26**:854 [Sept.] 1940) have described this process in mathematically exact terms. Their work, coupled with mine, explain what happened to Sognnaes' carious process: it was worn off when the diet was changed, not repaired or healed; the dentin that remained was secondary dentin or uninjured primary dentin. Hoffman makes the statement that this process is not common in human teeth. To sum up, at the present time no one has adequately demonstrated that carious lesions may be repaired or healed or that regenerative processes take place in necrotic dentin.

S. S. ARNIM, Richmond.
School of Dentistry Medical College of Virginia.

NOTE.—It was shown in 1936 by Arnim and his associates (Arnim, S. S.; Clarke, M. F.; Anderson, B. G., and Smith, A. H.: Dental Changes in Rats Consuming Diet Poor in Inorganic Salts, *Yale J. Biol. & Med.* **9**:117 [Oct.] 1936) of Yale University that alterations in the internal histologic structure of the molar teeth of rats are produced by diets deficient in phosphorus, calcium and other inorganic salts. Initial reparative processes were described following the addition of adequate mineral salts to the deficiency diets. The essential point in Sognnaes' paper "Dietary Repair of Experimental Caries" (*Science* **93**:617 [June 27] 1941) is his description of an even more effective reparative process in externally produced dental caries when the carious rats are placed on a non-caries producing luxury diet. Whether or not the two reparative processes are identical cannot be told without additional histologic study. It should be emphasized, however, that both investigators worked with rapidly growing young rats.—ED.

WEIL'S DISEASE

To the Editor:—In referring to your editorial on Weil's disease (THE JOURNAL, Oct. 11, 1941, p. 1266), permit me to make one suggestion. In speaking of the laboratory tests in the diagnosis, the editorial states that ". . . dark field examination of centrifuged blood during the first stage and of the urine after the tenth day are the most important." Unfortunately, in practice the pitfalls involved in the direct examination of blood by dark field illumination are such that little reliance can be placed on this method alone, even by experienced laboratory workers.

Recently I had occasion to speak with Dr. E. A. Fennel of Honolulu on this very subject. I had just completed a study on canine leptospirosis (Canine Leptospirosis in Pennsylvania, *J. Infect. Dis.* **69**:131-137 [Sept.-Oct.] 1941). In this study numerous blood specimens were examined serologically (agglutination-lysis test) and also by direct dark field illumination of centrifuged blood for evidence of leptospirosis. Fortunately, it was early decided that what it was thought were Leptospira in many instances were actually filaments of red blood cell or of platelet origin. Dr. Fennel and his co-workers had a similar experience in Hawaii (Weil's Disease and Artefacts, *Proc. Staff Meet. Clinic,* Honolulu **4,** March 1938). During an extensive study of human leptospirosis, the great number of positive reactions as demonstrated by dark field illumination of blood became alarmingly suggestive. This led to a thorough investigation in which normal controls were used. Finally it was decided that they were dealing with artefacts possibly derived from fibrin shreds, platelets, red cell stroma or reticulum. It was Dr. Fennel's conclusion that it was dangerous to make a positive diagnosis of Weil's disease by dark field examination of blood or urine of patients unless supported by confirmatory evidence (i. e. animal inoculation of blood or urine at the proper stage of the disease). Recent studies have demonstrated that the agglutination-lysis test on the patient's serum, beginning with the tenth day of the disease, is probably a quicker means to a diagnosis than animal inoculation—guinea pigs rarely show evidence of the disease, show jaundice or succumb to the infection before a week or ten days from the time of inoculation.

CLARA RAVEN, M.D., Youngstown, Ohio.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

ANNUAL CONGRESS ON MEDICAL EDUCATION AND LICENSURE

CHICAGO, Feb. 16-17, 1942. Council on Medical Education and Hospitals, Sec., Dr. William D. Cutter, 535 North Dearborn Street, Chicago.

MEDICAL CORPS, UNITED STATES NAVY

Examination. Assistant Surgeon with the permanent rank of Lieutenant (junior grade) and Acting Assistant Surgeon with the probationary rank of Lieutenant (junior grade), Jan. 5-9. Examination will be held at the Naval Hospitals at Chelsea, Mass., Newport, R. I., Brooklyn, Philadelphia, Norfolk, Va., Charleston, S. C., Pensacola, Fla., Corpus Christi, Tex., San Diego and Mare Island, Calif., Puget Sound, Wash., Great Lakes, Ill., Pearl Harbor, T. H., and Naval Medical Center, Washington, D. C. Apply Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, November 29, page 1912.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 16-18. Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARIZONA: * Phoenix, Jan. 6-7. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), Los Angeles, Dec. 10. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

COLORADO: * *Endorsement.* Denver, Jan. 6. *Examination.* Denver, Jan. 7-9. Applications must be on file not later than Dec. 22. Sec., Dr. George R. Buck, 831 Republic Bldg., Denver.

DELAWARE: Dover, July 14-16. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

GEORGIA: Atlanta, June. Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

HAWAII: Honolulu, Jan. 12-15. Sec., Dr. James A. Morgan, 48 Young Bldg., Honolulu.

IDAHO: Boise, Jan. 13. Dir., Bureau of Occupational License, Mr. Walter Curtis, 355 State Capitol Bldg., Boise.

ILLINOIS: Chicago, Jan. 20-22. Superintendent of Registration, Mr. Philip M. Harman, Department of Registration and Education, Springfield.

INDIANA: Indianapolis, June 16-18. Sec., Board of Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.

IOWA: * Des Moines, Jan. 15-17. Dir., Division of Licensure and Registration, State Department of Health, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

KANSAS: Topeka, Dec. 9-10. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. 7th St., Kansas City.

KENTUCKY: Louisville, Dec. 8-10. Sec., Dr. A. T. McCormack, 620 S. Third St., Louisville.

MARYLAND: *Medical.* Baltimore, Dec. 9-12. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 9-10. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MICHIGAN: * Ann Arbor and Detroit, June 10-12. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.

MINNESOTA: * Minneapolis, Jan. 20-22. Sec., Dr. Julian F. Du Bois, 230 Lowry Medical Arts Bldg., St. Paul.

MISSISSIPPI: *Reciprocity.* Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MONTANA: Helena, April 7-8. Sec., Dr. Otto G. Klein, First National Bank Bldg., Helena.

NEW HAMPSHIRE: Concord, March 12-13. Sec., Dr. T. P. Burroughs, Board of Registration in Medicine, State House, Concord.

NEW JERSEY: Trenton, June 16-17. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: * Santa Fe, April 13-14. Sec., Dr. Le Grand Ward 135 Sena Plaza, Santa Fe.

NORTH CAROLINA: *Endorsement.* December. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 6-9. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OKLAHOMA: * *Reciprocity.* Oklahoma City, Dec. 10. Sec., Dr. James D. Osborn, Jr., Frederick.

OREGON: Dec. 9-10. Portland, Jan. 21-23. Exec. Sec., Miss Lorienne M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, Jan. 6-10. Acting Sec., Bureau of Professional Licensing, Mrs. Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

RHODE ISLAND: * Providence, Jan. 8-9. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH DAKOTA: * Pierre, Jan. 13-14. Dir., Medical Licensure, Dr. J. F. D. Cook, State Board of Health, Pierre.

TENNESSEE: Memphis, Dec. 17-20. Sec., Dr. H. W. Qualls, 130 Madison Ave., Memphis.

VERMONT: Burlington, Feb. 10-12. Sec., Board of Medical Registration, Dr. F. J. Lawliss, Richford.

VIRGINIA: Richmond, Dec. 9-12. Sec., Dr. J. W. Preston, 30½ Franklin Road, Roanoke.

WISCONSIN: * Madison, Jan. 13-15. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

WYOMING: Cheyenne, Feb. 2-3. Sec., Dr. M. C. Keith, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, Dec. 16. Sec., Mr. Franklin E. Roach, Science Hall, University of Arizona, Tucson.

COLORADO: Denver, Dec. 10-11. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

CONNECTICUT: Feb. 14. Address State Board of Healing Arts, 1945 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, April 20-21. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 E. Municipal Bldg., Washington.

IOWA: Des Moines, Jan. 13. Dir., Division of Licensure and Registration, State Department of Health, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MICHIGAN: February 13-14. Sec., Miss Flora E. Dube, East Lansing.

MINNESOTA: Minneapolis, Jan. 6-7. Sec., Dr. J. Charnley McKinley, 126 Millard Hall, University of Minnesota, Minneapolis.

NEBRASKA: Omaha, Jan. 13-14. Dir., Bureau of Examining Boards, Mrs. Jeannette Crawford, 1009 State Capitol Bldg., Lincoln.

NEW MEXICO: Albuquerque, Feb. 2. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

Hawaii July Report

The Board of Medical Examiners of the Territory of Hawaii reports the written examination for medical licensure held at Honolulu, July 14-17, 1941. The examination covered 10 subjects and included 80 questions. An average of 75 per cent was required to pass. Thirteen candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Stanford University School of Medicine		(1939)	1
Chicago Medical School		(1935)	1
University of Illinois College of Medicine		(1940)	1
University of Minnesota Medical School		(1939)	1
Washington University School of Medicine		(1938)	1
Creighton University School of Medicine		(1936), (1939)	2
University of Nebraska College of Medicine		(1934)	1
University of Oregon Medical School		(1939)	1
Jefferson Medical College of Philadelphia		(1938)	1
University of Pennsylvania School of Medicine		(1927)	1
Medical College of Virginia		(1937)	1
McGill University Faculty of Medicine		(1940)	1

Five physicians were licensed to practice medicine on endorsement of credentials of the National Board of Medical Examiners from March 22 through July 17. The following schools were represented:

School	LICENSED BY ENDORSEMENT	Year Grad.
Northwestern University Medical School		(1940)
Rush Medical College		(1939)
Tulane University of Louisiana School of Medicine		(1938)
Washington University School of Medicine		(1940)
Jefferson Medical College of Philadelphia		(1936)

Alabama Reciprocity Report

The Alabama State Board of Medical Examiners report 10 physicians licensed to practice medicine by reciprocity and 1 physician so licensed on endorsement of credentials of the National Board of Medical Examiners from September 22 through October 24. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine		(1938)	Arkansas
Northwestern University Medical School		(1923)	Mississippi
State University of Iowa College of Medicine		(1940)	Iowa
Louisiana State University School of Medicine		(1940)	Louisiana
Tulane University of Louisiana School of Medicine		(1940, 2)	Louisiana
University of Michigan Medical School		(1933)	Michigan
Columbia Univ. College of Physicians and Surgeons		(1919)	New York
University of Cincinnati College of Medicine		(1941)	Ohio
University of Texas School of Medicine		(1937)	Texas

School	LICENSED BY ENDORSEMENT	Year Grad.
Yale University School of Medicine		(1936)

Idaho October Report

The Idaho State Medical Examining Board reports the written examination for medical licensure held at Boise, Oct. 6-9, 1941. The examination covered 23 subjects and included 140 questions. An average of 75 per cent was required to pass. Fourteen candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
University of Colorado School of Medicine		(1939), (1940)	2
George Washington University School of Medicine		(1940)	1
Rush Medical College		(1939)	1
Northwestern University Medical School		(1933), (1936)	2
University of Illinois College of Medicine		(1941)	1
Johns Hopkins University School of Medicine		(1940)	1
University of Nebraska College of Medicine		(1932), (1939)	2
University of Oklahoma School of Medicine		(1939)	1
University of Oregon Medical School		(1939)	1
Temple University School of Medicine		(1940)	1
University of Pennsylvania School of Medicine		(1933)	1

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Right of Federal Courts to Require Physical Examination of Plaintiff in Personal Injury Action.—The plaintiff brought suit in the United States district court for the northern district of Illinois to recover damages for personal injuries. On motion of the defendant and by virtue of rule 35 of the Rules of Civil Procedure for District Courts of the United States, which provides—

> In an action in which the mental or physical condition of a party is in controversy, the court in which the action is pending may order him to submit to a physical or mental examination by a physician. . . .

the trial court ordered the plaintiff to submit to a physical examination by physicians appointed by the court to determine the nature and extent of her injuries. The plaintiff refused to comply with the order and the trial court found her guilty of contempt of court and ordered her commitment to jail. The action of the trial court was affirmed by the circuit court of appeals, 7th circuit, and the plaintiff appealed to the Supreme Court of the United States.

The principal question for the determination of the Supreme Court concerned the validity of rule 35. This rule, said the Court, was promulgated by this court by the authority of the Act of Congress of June 19, 1934 which empowered this court to prescribe, by general rules, the forms of process, writs, pleadings and motions and the practice and procedure in civil actions at law, provided such rules should not abridge, enlarge or modify the substantive rights of any litigant. While the plaintiff admitted that rule 35 was a rule of procedure and was a matter of adjective rather than substantive law, she contended that it affected a substantive right and was therefore not justified by the Congressional Act just referred to. The word "substantive," she argued, meant "important" or "substantial" and the right involved here was the right to freedom from invasion of the person. The Supreme Court held, however, that substantive rights were only those which had been actually conferred by law and did not include all important and substantial individual rights which were often recognized. The right contended for by the plaintiff, said the Court, had failed to receive legislative recognition by Congress, and furthermore it was no more important than many other rights enjoyed by litigants before the Federal Rules of Civil Procedure were changed. The plaintiff, said the Court, need not have submitted to the jurisdiction of the federal courts if she was unwilling to comply with their rules. Finally, the plaintiff contended that rule 35 constituted a major change in policy which was not intended by Congress. The Supreme Court pointed out, however, that the rules were submitted to Congress in accordance with the act authorizing their promulgation and that no adverse action was taken, although rule 35, the specific rule in question here, was particularly called to the attention of the House and Senate committees. Accordingly, the Supreme Court concluded that rule 35 was within the authority granted to that court by the Act of 1934.

The Supreme Court held, however, that the trial court had erred in ordering the plaintiff's commitment to jail for refusing to submit to a physical examination because under the rules referred to the court had no such power. The order of commitment was in effect nullified and the cause was remanded for further proceedings in conformity with the opinion.—*Sibbach v. Wilson & Co., Inc., 61 S. Ct. 422 (1941).*

Charitable Hospitals: Liability for Burns Caused by Negligence of Nurse Employee.—The plaintiff entered the Good Samaritan Hospital, a charitable corporation, as a pay patient to undergo a gallbladder operation. Following the operation and while still under the influence of the anesthetic, he suffered third degree burns on each of his legs. Subsequently he sued the hospital, alleging that the burns resulted from the negligence of a nurse employee of the hospital. From a judgment of the trial court sustaining a demurrer interposed by the hospital, the plaintiff appealed to the Supreme Court of Florida.

The hospital contended that the action of the trial court was proper since a charitable hospital is not liable for injuries caused by the negligent acts of one of its nurse employees, even though it charges those patients who are able to pay and even though the person injured is a pay patient. The hosiptal argued that the principle of nonliability of a charitable hospital under such circumstances is based on one or more of several theories. First, it argued, nonliability is accorded by reason of the so-called trust fund theory, that is, the funds of a charitable institution are held in trust for specific charitable purposes and should not be diverted to pay damages for negligence. The Supreme Court refused to accept that theory as an adequate basis for nonliability because the courts that have used that theory as a basis of nonliability have applied it so inconsistently. In most of the jurisdictions adopting that theory a charitable hospital has been held liable for negligent injuries to strangers and to employees and even to patients when the institution has been negligent in selecting its employees. If the "trust fund" theory is to be applied logically, said the Court, a charity should be exempt in all cases or not at all. The hospital next advanced as a reason for nonliability the so-called public policy theory—that is, it is contrary to public policy to permit an institution inspired and supported by benevolence and devoting its assets and energies to the relief of the sick and the needy to be held liable for the payment of a claim for damages resulting from the negligence of one of its servants. Public policy, answered the Supreme Court, should be determined by the constitution, laws and judicial decisions of a state. The constitution and laws of Florida, however, have gone no further than to exempt charitable institutions from taxation—not from liability for negligence. The hospital next urged that the doctrine of respondeat superior (that is, the master is responsible for the negligence of his servant while engaged in the master's business) should not apply to a charitable hospital because such a hospital receives no profit or benefit from the act of its servants. Here again, said the Court, if the doctrine of respondeat superior does apply, then there should be no liability for injuries to strangers but liability under such circumstances is imposed by the courts on charitable hospitals. Whether or not the employees were servants so as to hold their employer liable for their acts of negligence depends on the nature of their duties, not the nature of the hospital.

Finally, the hospital contended that one who accepts benefits by becoming a patient of a charitable institution impliedly assents to hold it exempt from liability on any claim based on the negligence of its servants, that is, by accepting the benefit of the services of the institution, the patient assumes the risk of negligence. The Supreme Court held, however, that when a patient has paid a fair compensation for services rendered he cannot be said to have agreed impliedly to forego all claims for damages due to the negligence of the servants of the institution.

In conclusion, the Supreme Court held that it could not find any sound principle of law for exempting a charitable hospital from liability for the acts of negligence of its servants. The judgment for the hospital was accordingly reversed.—*Nicholson v. Good Samaritan Hospital, 199 So. 344 (Fla., 1940).*

Malpractice: Liability of Operating Surgeon for Negligence in After-Care of Patient.—The plaintiff entered the Hartford Hospital as a ward patient to undergo amputation of a toe. The hospital's chief of staff assigned an intern to perform the operation and designated the defendant, an assistant surgeon on the staff, to be present and to render such assistance as might be needed. The resulting open wound from the operation was "packed" with petrolatum gauze by the intern surgeon and the plaintiff was returned to his ward. The next day the intern removed the packing from the wound. Subsequent after-care was furnished under the supervision of the physician in charge of the ward in which the plaintiff had been placed. The plaintiff remained in the hospital for about three weeks, during which time the wound healed fairly well, although there was a small amount of discharge from the stump. A few days after the plaintiff returned to his home, however, the area around the wound began to ulcerate. The plaintiff's private physician then discovered in the wound a piece of tightly rolled decayed gauze which had been inserted during the operation but not thereafter removed. A resulting infection spread and caused

serious injury. Subsequently the plaintiff sued the defendant physician, the assistant surgeon who had supervised the operation performed by the intern, for damages, and from an adverse judgment he appealed to the Supreme Court of Errors of Connecticut.

The plaintiff contended that the defendant, having been present at and assisted in the operation, was guilty of gross misconduct in failing to render adequate after-care to the plaintiff and in allowing the after-care to pass into the hands of other physicians. The plaintiff, said the Supreme Court of Errors, to recover must prove that the defendant failed to exercise the degree of care, skill and diligence ordinarily exercised by physicians and surgeons in the same line of practice in the general neighborhood of Hartford. Since there was no claim of negligence in connection with the operation itself, the plaintiff must show that the defendant was under some legal obligation to treat the patient after the operation and that he failed to satisfy that obligation. The evidence showed that the defendant was regularly on duty in the women's ward, not the ward in which the plaintiff was a patient. He had been assigned merely to assist the intern and "except for being present at the operation had no connection with the plaintiff's care or treatment." When the operation was over, the plaintiff was returned to the care of the physician in charge of his own ward. There was no special contract whereby the defendant agreed to treat the plaintiff during his hospitalization. A surgeon who assists at an operation, continued the Court, is not, in the absence of a specific contract, liable for the rendering of after-care. In such a case the surgeon may rely on the custom of the hospital in divorcing the operation from the after-care. Furthermore, in this day and age when it is well known that there are physicians and surgeons of special skill in particular branches of their profession, it cannot safely be announced as a general rule of law, applicable to a case of this nature, that a surgeon who performs an operation is liable for the negligence of other physicians, nurses or interns in hospitals in the after-treatment unless the evidence shows that he specially undertakes such employment. The judgment for the defendant was accordingly affirmed. —*Sheridan v. Quarrier, 16 A. (2d) 479 (Conn., 1940).*

Malpractice: Alleged Erroneous Diagnosis of Gonorrhea.—One of the plaintiffs consulted the defendant physician relative to an itching in the region of her vagina. The physician took her history, made a smear from the vagina, urethra and cervix and after a microscopic examination of the smear (referred to in the reported decision as the methylene blue test) made a diagnosis of gonorrhea and so informed his patient, asking that her husband, the other plaintiff, consult him. The physician then instituted sulfanilamide therapy on the wife. When the husband consulted the physician, the physician was unable to obtain a smear from the entrance of the husband's urethra but "obtained an imprint" which did not reveal evidence of gonorrhea on microscopic examination. He informed the husband that he doubted whether he had gonorrhea but advised immediate treatment. The husband, however, never returned for treatment. Later both plaintiffs consulted another physician, who made smears and sent them to a laboratory for examination, which after making a test referred to in the reported decision as a "gram negative stain" test reported "negative" specimens. Then the second physician determined that neither the husband nor the wife had gonorrhea. The plaintiffs thereafter sued the defendant physician for malpractice. Shortly after the institution of the action the defendant physician sent the slide containing the smear he had taken from the wife to two laboratories, both of which performed the "gram negative stain" test and reported a "positive reaction showing gonococci." From a judgment in favor of the physician the plaintiffs appealed to the district court of appeal, second district, division 2, California.

The first question for the appellate court's determination was whether the evidence before the trial court was sufficient to sustain a judgment in favor of the physician and against the wife. A physician and surgeon, said the court, is not required to make a perfect diagnosis but is required to have only that degree of skill and learning ordinarily possessed by physicians of good standing practicing in the same locality and to use ordinary care and diligence in applying that learning to the treatment of his patient. The evidence in this case discloses that it was the ordinary practice of physicians and surgeons in the community in which the defendant physician practiced in making a diagnosis of gonorrhea to use either the methylene blue test or the gram negative stain test. In this case the evidence discloses that at the time the wife consulted the defendant physician he made the methylene blue test, which showed the patient suffering from gonorrhea. Subsequently, the same slides were submitted by him to two independent laboratories where gram negative stain tests were made showing the presence of gonococci. It therefore appears that there was substantial evidence to support the finding of the trial court that the defendant physician had used the requisite skill in diagnosing the wife's complaint, and a judgment in favor of the physician was proper.

The next question the court was called on to determine was whether or not the evidence before the trial court was sufficient to sustain a judgment in favor of the physician and against the husband. The appellate court concluded likewise that the judgment in favor of the physician was proper. The evidence is clear, said the court, that the physician after examining the husband told him that he did not think he was suffering from gonorrhea but recommended that he return for further examination and treatment, which the husband refused to do. Obviously the physician's conduct relative to the husband was proper and not actionable.

For the reasons stated, the judgment in favor of the physician was affirmed.—*Ries v. Reinard, 117 P. (2d) 386 (Calif., 1941).*

Intoxication: Refusal of Defendant to Submit to Blood Test Admissible in Evidence.—The fact, said the Supreme Court of Iowa, that a defendant accused of operating a motor vehicle while intoxicated declined shortly after his arrest to submit to a blood test to determine whether or not he was intoxicated is admissible in evidence and may be considered by the jury as a circumstance, with all other facts and circumstances developed at the trial, in determining whether or not he was intoxicated at the time in question. While a defendant cannot be compelled to testify, under the practice in Iowa courts his refusal to testify can be considered and commented on. If he cannot be compelled to submit to a blood test, it is because he cannot be compelled to give evidence. Since his refusal to give evidence by testifying can be considered, his refusal to give evidence by submitting to a blood test can likewise be considered. The Iowa constitution contains no express provision prohibiting self incrimination, and the only constitutional provision that would appear to guarantee such protection is the due process clause, which in the opinion of the court does not render inadmissible testimony that the defendant refused to submit to a blood test. It is proper, continued the court, to show the defendant's conduct, demeanor and statements, whether oral or written, his attitude and relations toward the crime, if there was one, and the weight of these circumstances is for the jury to determine. The fact that the defendant declined to submit to a blood test is such a circumstance as may be shown for the consideration of the jury.—*State v. Benson, 300 N. W. 275 (Iowa, 1941).*

Society Proceedings

COMING MEETINGS

Annual Congress on Industrial Health, Chicago, Jan. 12-13. Dr. C. M. Peterson, 535 North Dearborn St., Chicago, Secretary.

American Academy of Orthopedic Surgeons, Atlantic City, N. J., Jan. 11-15. Dr. Rexford L. Diveley, 1103 Grand Ave., Kansas City, Mo., Secretary.

American Association for the Study of Neoplastic Diseases, Washington, D. C., Dec. 18-20. Dr. Eugene R. Whitmore, 2139 Wyoming Ave. N.W., Washington, D. C., Secretary.

Puerto Rico, Medical Association of, Santurce, Dec. 11-14. Dr. David E. Garcia, P. O. Box 3866, Santurce, Secretary.

Society of American Bacteriologists, Baltimore, Dec. 29-31. Dr. I. L. Baldwin, Agricultural Hall, University of Wisconsin, Madison, Wis., Secretary.

Southern Surgical Association, Pinehurst, N. C., Dec. 9-11. Dr. E. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1931 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Annals of Internal Medicine, Lancaster, Pa.

15:347-628 (Sept.) 1941

Blood Pressure Reducing Property of Extracts of Kidneys in Hypertensive Patients and Animals. I. H. Page, O. M. Helmer, K. G. Kohlstaedt, G. F. Kempf, W. D. Gambill and R. D. Taylor, Indianapolis.—p. 347.

Results from Management of Bleeding Gastric and Duodenal Ulcer. T. G. Miller, Philadelphia.—p. 390.

*Weil's Disease: Report of Six Cases. H. K. Rathbun and J. M. Waghelstein, Baltimore.—p. 395.

Diagnosis and Management of Brucellosis. W. M. Simpson, Dayton, Ohio.—p. 408.

Sulfonamide Therapy of Staphylococcic Septicemia. R. G. Torrey, Philadelphia; L. A. Julianelle, St. Louis, and H. G. McNamee, Philadelphia. —p. 431.

Value of Sternal Marrow Aspiration as Method of Bone Marrow Biopsy. E. H. Falconer and M. E. Leonard, San Francisco.—p. 446.

Changes in Cardiac Shadow Following Pharmacologic "Shock" Therapy of Schizophrenia. H. W. Sterling, Little Rock, Ark., and C. N. Baganz, Lyons, N. J.—p. 459.

Electrocardiographic Changes in Stab and Gunshot Wounds of Heart, with Review of Literature. J. Solovay, G. D. Rice, Camp Custer, Mich., and H. U. Solovay, Brooklyn.—p. 465.

Tachycardia and Sensitivity to Heat as Indications for Basal Metabolic Rate Determination. A. Ravin, Denver.—p. 478.

Clinical Studies with Aid of Radio Phosphorus: IV. Retention in Blood, Excretion and Therapeutic Effect of Radio Phosphorus on Patients with Leukemia. L. A. Erf, L. W. Tuttle and J. H. Lawrence, Berkeley, Calif.—p. 487.

*Symptomatic Hemolytic Anemia. K. Singer and W. Dameshek, Boston. —p. 544.

Experimental Exophthalmos and Associated Myopathy Induced by Thyrotropic Hormone. R. B. Aird, San Francisco.—p. 564.

Responsibility of American College of Physicians for Postgraduate Training. E. L. Bortz, Philadelphia.—p. 582.

Weil's Disease.—Rathbun and Waghelstein suggest that in this country Weil's disease would probably be diagnosed more frequently if the illness were considered in the differential diagnosis of jaundice of unknown cause or any obscure illness characterized by muscle pains, conjunctivitis and sudden unexplained fever. The final diagnosis rests on the results of the laboratory procedures. Agglutination reactions and guinea pig inoculations with blood and urine are diagnostic aids. The history of contact with the urine of wild rats is a valuable aid. Leukocytosis and albuminuria are important points in differentiating Weil's disease from catarrhal jaundice. Probably the most noteworthy feature of the disease is the extreme apathy of the patients. This was an outstanding characteristic of 4 of the 6 patients whom the authors encountered within twenty months. One patient admitted with jaundice and azotemia was thought to be suffering from acute yellow atrophy, suggesting that any similar patient with jaundice of unknown cause should be thoroughly investigated for the possibility of Weil's disease. Age, cardiac function and the presence or absence of uremia and jaundice influence the prognosis. The older the patient the more grave the prognosis. The fatality rate for patients without jaundice is negligible. Uremia has an unfavorable influence on the prognosis, particularly if oliguria or anuria is present. An active immunity may be produced by the injection of killed organisms, and Inada and his associates reduced the fatality rate from 30.6 to 17.3 per cent with immunized horse and human convalescent serums. A high carbohydrate-low fat diet might prove beneficial in the treatment of patients with jaundice.

Symptomatic Hemolytic Anemia.—Singer and Dameshek present 7 cases of benign and malignant neoplasms concomitant with hemolytic anemia, or symptomatic hemolytic anemia. The symptoms and signs of the anemia are a combination of the hemolytic process and the underlying disease. The associated diseases in their 7 patients were dermoid cyst, chronic lymphatic leukemia, Hodgkin's disease, lymphosarcoma, severe hepatic disease and pneumonia with a panagglutinin. Spherocytosis and increased hypotonic fragility are often present in cases of symptomatic hemolytic anemia, although a "pseudomacrocytic" blood picture may be present. The spherocytosis may mean that the abnormality is due to undefined hemolyzing agents. The recognition of these cases is of importance in evaluating the type of anemia present in certain cases of lymphomatous disease and in ruling out an "idiopathic" hemolytic process. Splenectomy may be valueless, but treatment of the underlying process may be curative. The recognition of these cases further supports the hypothesis that various hemolytic agents, usually acting through the spleen, are responsible for hemolytic anemias.

Annals of Otol., Rhin. and Laryngology, St. Louis

50:629-966 (Sept.) 1941. **Partial Index**

Infection as Cause of Fibrosis of Esophagus. H. P. Mosher, Marblehead, Mass.—p. 633.

Early Diagnosis of Carcinoma of Esophagus. J. R. Lindsay, Chicago. —p. 675.

Adenocarcinoma of Larynx. G. B. New and J. B. Erich, Rochester, Minn.—p. 706.

Chondroma of Larynx: Report of Case. H. B. Orton, Newark, N. J. —p. 715.

Treatment of Cancer of Larynx with Emphasis on Conservatism. F. A. Figi, Rochester, Minn.—p. 723.

Laryngeal Tuberculosis with Some of the More Recent Advances in Treatment. F. R. Spencer, Boulder, Colo.—p. 735.

Laryngeal Tuberculosis: Study of 500 Cases of Pulmonary Tuberculosis with Résumé Based on Twenty-Eight Years of Experience. J. P. Dworetzky, Liberty, N. Y., and O. C. Risch, New York.—p. 745.

Laryngeal Tumors—Voice Recordings Before and After Operation. M. Equen, Atlanta, Ga.—p. 776.

Carotid Sinus Syndrome. M. F. Jones and J. M. Converse, New York. —p. 806.

Histopathologic Changes Occurring in Chronic Infection of Pharynx. H. P. Schenck, Philadelphia.—p. 817.

Vegetal Foreign Bodies in Bronchi: Analysis of Forty Cases. L. G. Richards, Boston.—p. 860.

Annals of Surgery, Philadelphia

114:481-800 (Oct.) 1941. **Partial Index**

*Results of Partial Gastrectomy for Bleeding Duodenal, Gastric and Gastrojejunal Ulcer. W. Walters and W. H. Cleveland, Rochester, Minn.—p. 481.

Gastric Ulcer: Significance of This Diagnosis and Its Relationship to Cancer. A. W. Allen and C. E. Welch, Boston.—p. 498.

Massive Gastric Hemorrhage, with Special Reference to Peptic Ulcer. J. V. Bohrer, New York.—p. 510.

Surgery in Peptic Ulceration of Stomach and Duodenum in Infants and Children. C. E. Bird, Providence, R. I.; Margaret A. Limper, Louisville, Ky., and J. M. Mayer, Mayfield, Ky.—p. 526.

*Fifty-Two Proved Cases of Carcinoma of Pancreas and Ampulla of Vater, with Special Reference to Fatty Infiltration of Liver. J. G. Schnedorf and T. G. Orr, Kansas City, Kan.—p. 603.

Aseptic, Immediate Anastomosis Following Resection of Colon for Carcinoma. J. H. Gibbon Jr. and Clare C. Hodge, Philadelphia.—p. 635.

*Chronic Ulcerative Colitis: Summary of Evidence Implicating Bacterium Necrophorum as Etiologic Agent. L. R. Dragstedt, G. M. Dack and J. B. Kirsner, Chicago.—p. 653.

Intestinal Antisepsis, with Special Reference to Sulfanilylguanidine. W. M. Firor and E. J. Poth, Baltimore.—p. 663.

Syndrome of Mesenteric or Subperitoneal Hemorrhage (Abdominal Apoplexy). G. F. Cushman and A. R. Kilgore, San Francisco.—p. 672.

Experimental Production of Chronic Cholecystitis by Obstructive Lesions of Cystic Duct. W. H. Cole, M. V. Novak and E. O. Hughes, Chicago.—p. 682.

Cerebrospinal Rhinorrhea: Surgical Repair of Craniosinus Fistula. A. W. Adson, Rochester, Minn.—p. 697.

Surgery of Hyperparathyroidism: Occurrence of Parathyroids in Anterior Mediastinum and Division of Operation into Two Stages. O. Cope, Boston.—p. 706.

Total Thoracic and Partial to Total Lumbar Sympathectomy and Celiac Ganglionectomy in Treatment of Hypertension. K. S. Grimson, Chicago.—p. 753.

*Ascorbic Acid and Human Wound Healing. C. C. Lund and J. H. Crandon, Boston.—p. 776.

Effect of Local and Oral Administration of Cod Liver Oil on Rate of Wound Healing in Vitamin A Deficient and Normal Rats. H. Brandaleone and E. Papper, New York.—p. 791.

Bleeding Peptic Ulcer.—Walters and Cleveland state that their results with partial gastrectomy performed during 1932 to 1936 inclusive support the premise that this operation offers the best chance of cure or amelioration of symptoms of bleeding peptic ulcer and the best prophylaxis against further hemor-

rhage. When the procedures which have proved of least merit are eliminated results should be improved. Thus, among the 119 patients who had resections in 1940 for bleeding peptic ulcer the pyloric antrum was removed in all but 1 and the posterior Pólya type of resection and anastomosis was employed in 94.1 per cent. The 1940 results should be superior. During the 1932 to 1936 period, seven pyloric antrums were not removed and only 75 per cent of the partial gastrectomies were of the posterior Pólya type.

Carcinoma of Pancreas.—Schnedorf and Orr review the records of the 35 cases of primary carcinoma of the pancreas and the 17 of the ampulla of Vater encountered at the University of Kansas Hospitals during the last twenty years. Only cases in which the diagnosis was proved at necropsy or by surgical biopsy are included. The disease was rapidly fatal in most patients. Thorough study of the function of the pancreas is advisable for the diagnosis of an early obscure cancer of the pancreas or of the ampulla of Vater in all patients with inexplicable abdominal complaints. Radical resection offers the only hope for cure. Palliative operation is indicated in cases of advanced disease. Fatty infiltration and hepatic degeneration were found at necropsy in 10 of the 52 patients. On the basis of experimental evidence the feeding of lecithin, choline, pancreatic extract or lipocaic is indicated in the preoperative and postoperative treatment of such patients to prevent fatty changes in the liver and to maintain life.

Chronic Ulcerative Colitis.—As a result of their study of the problem of chronic ulcerative colitis carried on in the departments of surgery, bacteriology and medicine of the University of Chicago during the last eight years Dragstedt and his associates are convinced that Bacterium necrophorum plays an etiologic role in the disease. They present the following evidence in support of their contention: 1. It is the predominant organism in the isolated colon in ulcerative colitis during exacerbations, and it disappears during periods of spontaneous quiescence. 2. It has been found in most cases of typical ulcerative colitis. 3. Specific antibodies for it have been found in the blood of patients with chronic ulcerative colitis and not in the blood of normal persons. 4. The organism is pathogenic for rabbits. 5. The literature indicates that it is similar to if not identical with Bacillus or Bacteroides funduliformis, repeatedly associated with necrotic lesions of the mucous membranes in man and with Bacillus necrophorus, which is believed to cause various necrotic lesions in domestic animals. Bacterium necrophorum is probably present in the normal alimentary tract of man and monkeys and requires some additional factors producing necrosis of the mucosa to furnish conditions suitable for its growth.

Wound Healing and Ascorbic Acid.—Lund and Crandon studied the effect that preoperative diets and plasma vitamin C levels had on the postoperative healing of abdominal wounds. Postoperative hernias or disruptions are the result of poor healing. Of 58 patients who returned to the follow-up clinic from three months to one year after discharge 9 had hernia. Those with low preoperative plasma levels showed a larger percentage of hernia than did those with high levels. The same was true of patients with small amounts of the vitamin in their preoperative diets. However, low plasma values do not always mean depleted reserves, but the wounds of all patients with higher values should heal in so far as ascorbic acid is a factor in their healing. The disrupted wounds of 12 patients have been studied. Despite the low vitamin levels of 8 patients scurvy played no part in the disruption. The vitamin C reserves of 3 of the 4 remaining patients were severely depleted, and scurvy probably delayed or prevented the healing of their wounds. The main cause of the accident in the last patient was undoubtedly sepsis and not scurvy. The data suggest that a larger part of the problem of disruption will be solved by an improved suturing technic than will be solved by studies of or treatment with vitamin C. However, the fact that in a few instances disruption occurs in conjunction with severely depleted vitamin C reserves indicates that these reserves should be studied preoperatively and that if they are low proper treatment should be instituted.

Archives of Ophthalmology, Chicago

26:543-726 (Oct.) 1941

Bilateral Uveitis with Associated Detachment of Retina. A. Rados, Newark, N. J.—p. 543.
Color Stereoscopic Phenomenon. A. Loewenstein and G. Donald, Glasgow, Scotland.—p. 553.
Retina in Systemic Vascular Hypertension: Clinical Study of Caliber of Retinal Arterioles and Retinal Arterial Diastolic Blood Pressure. F. L. P. Koch, New York.—p. 565.
*Allergic Dermatitis and Conjunctivitis from Paredrine Hydrobromide. J. Laval, New York.—p. 585.
Acute Follicular Conjunctivitis Resembling Béal's Type: Report of Two Cases, with Short Review of Literature. N. K. Bidyādhar, Sonpur State, Sonpur Raj, India.—p. 587.
Kayser-Fleischer Ring Associated with Hepatolenticular Degeneration: Report of Six Cases. S. Gartner, New York.—p. 595.
Biochemistry of Lens: XIV. Pathogenesis of Electric Cataract. J. G. Bellows and H. Chinn, Chicago.—p. 606.
Thiamine Hydrochloride in Treatment of Tryparsamide Amblyopia. P. J. Leinfelder and R. B. Stump, Iowa City.—p. 613.
Monocular Myasthenia Gravis: Prostigmine Methylsulfate as Differential Diagnostic Agent. M. T. Moore, Philadelphia.—p. 619.
Fusional Movements in Permanent Strabismus: Study of Role of Central and Peripheral Retinal Regions in Act of Binocular Vision in Squint. H. M. Burian, Hanover, N. H.—p. 626.
Unilateral Microphthalmia with Congenital Anterior Synechiae and Syndactyly. M. L. Berliner, New York.—p. 653.
Vertical Nystagmus Following Lesions of Cerebellar Vermis. E. A. Spiegel, Philadelphia, and N. P. Scala, Washington, D. C.—p. 661.
Angioid Streaks. R. O. Scholz, Baltimore.—p. 677.

Dermatitis and Conjunctivitis from Paredrine Hydrobromide.—Laval reports a case of conjunctivitis and dermatitis venenata following the use of 3 per cent paredrine hydrobromide as a mydriatic. He has used the 1 and 3 per cent solution for more than a thousand patients with no other ill effects. His patient had previously used a 1 per cent solution for two and a half months and had had no adverse reaction.

Archives of Surgery, Chicago

43:541-734 (Oct.) 1941

Osteogenic Sarcoma: Analysis of Eighty Cases. C. E. Badgley and M. Batts Jr., Ann Arbor, Mich.—p. 541.
Reproduction of Ulcerative Colitis in Dogs. J. K. Poppe, New Haven, Conn.—p. 551.
*Subdural Hydroma. D. G. da Costa and A. W. Adson, Rochester, Minn. —p. 559.
Cessation of Respiratory Exchange. W. H. Cassels, Chicago.—p. 568.
Bladder of Women After Operation. C. Lintgen, Philadelphia.—p. 573.
Specific Therapeutic Shock—The Hugh Young Reaction. W. J. MacNeal, New York.—p. 579.
Acute Intussusception. C. W. Mayo and R. Woodruff, Rochester, Minn. —p. 583.
*Giant Intracanalicular Fibroadenoma of Breast. F. M. Owens Jr. and W. E. Adams, Chicago.—p. 588.
Adenocarcinoma of Tongue Arising from Vestige of Median Anlage of Thyroid Gland: Report of Case. W. J. Cromartie and O. G. Nelson, Nashville, Tenn.—p. 599.
Cremasteric Spasm. M. Muschat, Philadelphia.—p. 609.
Stainless Steel and Vitallium in Internal Fixation of Bone: Comparison. J. A. Key, St. Louis.—p. 615.
Traumatic Chylothorax. D. D. Smith and E. Woliver, Cincinnati. —p. 627.
*Differentiation of Surgical Jaundice from Severe Damage of Liver (Subacute Yellow Atrophy) Clinically Simulating It. J. H. Olwin, Chicago. —p. 633.

Subdural Hygroma.—Da Costa and Adson report the case of a boy aged 9 years who had been thrown from his pony two days prior to admission to the Mayo Clinic. He regained consciousness in about an hour after he was found but continued drowsy and vomited. At a hospital it was determined that his left arm and leg were partially paralyzed. The mother stated that the paralysis was less severe when he regained consciousness. During the night of the first day in the hospital the boy could be aroused, although he was drowsy. The vomiting ceased. The following day the left arm and hand appeared to be weaker. The drowsiness had abated somewhat. He had hemiparesis of the entire left side, including the face. An exploratory operation through a temporal decompression was performed. On perforation of the dura, blood-tinged cerebrospinal fluid spurted out, and further opening revealed a large pool of blood-tinged fluid between the dura and the arachnoid compressing the temporal, parietal and frontal lobes on the right side. The rent in the arachnoid was in the region of the sylvian fissure and from it more cerebrospinal fluid could be seen escaping. Approximately 4 ounces (120 cc.) of cerebrospinal fluid was removed when pulsations in the cerebral artery could be seen. To remove

any subsequent collection of fluid while the ventricles refilled and the brain was being replaced, a Penrose wick was inserted into the wound and left in place for four days. During this time fluid intake was encouraged. Convalescence was uneventful. On the eighth postoperative day normal function had returned to the foot and the arm. Full function of the face and the hand returned by the ninth postoperative day. He was dismissed on the fifteenth day with full function, except a slight incoordination of his fingers and a slight limp on walking alone. A subsequent report indicated that the boy had recovered completely.

Fibroadenoma of Breast.—Owens and Adams discuss the gross and microscopic features of "cystosarcoma phyllodes." They report a case of their own and summarize the 12 cases reported since 1931, when Lee and Pack collected 105 from the literature and added 4 personal cases. A list of the various names applied to the tumor is given, and the authors believe that the simple descriptive term "giant intracanalicular fibroadenoma of the breast" should be accepted.

Surgical Jaundice and Yellow Atrophy.—Olwin determined the prothrombin level in 62 patients with jaundice and found that in patients with obstruction of the common duct it varies widely, depending on the duration of the jaundice and on general nutrition and diet. In nearly all these patients, except those who had jaundice in the later stages, the prothrombin level after vitamin therapy was near normal in one to four days. However, only a small percentage of patients with hepatic cirrhosis, if hepatic damage is not too severe or has not been present too long, will show some response to vitamin K therapy even after intensive and prolonged vitamin and bile salts therapy. The results indicate that rather than the original prothrombin level the response of the liver to vitamin K as reflected in the prothrombin rise is the important point in the measurement of hepatic function. To eliminate absorption of vitamin K from the gastrointestinal tract the vitamin is given intravenously. If the original prothrombin determination is low 2 mg. of menadione is given intravenously and the prothrombin level is rechecked after twenty hours. If it is still below 100 per cent, a second dose is given and the level again determined in twenty-four hours. Most patients with good hepatic function will show a normal or nearly normal level at this time. Patients who fail to respond normally are then given vitamin K preparations orally, with occasional supplementary intravenous doses. Three patients with severe jaundice failed to show the usual response, and the similarity of their prothrombin studies combined with the severe hepatic damage in the 2 studied post mortem suggests that silent jaundice definitely influences the procedure. Patients who do not show a fairly prompt prothrombin response to vitamin K therapy should not be subjected to operation until the proper response occurs. Some patients will never show this response and will die, but they will have been spared the expense and distress of a major surgical procedure. Others, who otherwise may have died, may recover under medical management.

Connecticut State Medical Journal, Hartford

5:633-716 (Sept.) 1941

Maternal Mortality in Connecticut: Analysis of Maternal Deaths During 1939. J. H. Howard, Bridgeport.—p. 646.
Some Remarks on "Cases and Observations by Medical Society of New Haven County." G. Blumer, New Haven.—p. 652.
Iontophoresis with Zinc Peroxide in Treatment of Indolent Ulcers: Preliminary Report. A. D. Gurewitsch, New York.—p. 664.
Diagnosis by Gastroscopy. S. D. Kushlan, New Haven.—p. 665.
Necessity for Rectosigmoidal Examination. S. B. Kleiner, New Haven.—p. 667.
Congenital Urologic Anomalies. C. H. Nueswanger, Waterbury.—p. 671.
Acute Aleukemic Leukemia. J. E. Crane, Stamford.—p. 673.
Tularemia in Connecticut. E. H. Gibbons, Newington; E. L. Lamoureux, Hartford, and H. A. Arkless, Newington.—p. 679.
Psychiatric Contraindications to Marriage. E. Kahn, New Haven.—p. 684.
Unusual Case of Hodgkin's Disease. W. Finkelstein, Waterbury.—p. 687.
New Yale Medical Library. H. Thomas, New Haven.—p. 689.

Indiana State Medical Assn. Journal, Indianapolis

34:447-540 (Sept.) 1941

Tracheobronchial Obstruction and Its Relation to Pulmonary Tuberculosis. P. H. Becker and G. W. Holmes, Crown Point.—p. 447.
Thoracoplasty: Types of Tuberculosis Suitable for Operation: Report of Twenty-Five Cases. J. W. Strayer and G. A. Thomas, Lafayette.—p. 451.
Electrical Convulsion Therapy in Mental Disorders. G. E. Metcalfe, South Bend.—p. 455.
Blood Stain of Cornea. B. J. Larkin, Indianapolis.—p. 459.
Unexplained Fever. R. E. Mitchell, Indianapolis.—p. 461.
Cancer of Lung. R. B. Sanderson, South Bend.—p. 463.

Journal of Allergy, St. Louis

12:425-522 (July) 1941

Stability of Reagin-Neutralizing Substance in Ragweed Pollen at Various Hydrogen Ion Concentrations. A. C. Batchelder and T. A. Gonder Jr., Baltimore.—p. 425.
Species Specificity of Alternaria in Asthma and Hay Fever. H. N. Pratt, Boston, with assistance of Carolyn L. Roorbach.—p. 431.
Studies in Absorption of Undigested Protein: X. Absorption from Gallbladder. M. Harten, I. Gray, S. Livingston and M. Walzer, Brooklyn.—p. 438.
Studies on Blood Histamine in Cases of Allergy: III. Effect of Administration of Histaminase on Symptoms and Histamine Content of Blood in Patients with Allergy. B. Rose, Montreal, Canada.—p. 441.
Blood Histamine Level in Asthma and in Eosinophilia. T. G. Randolph and F. M. Rackemann, Boston.—p. 450.
Coseasonal Intracutaneous Treatment of Hay Fever. F. K. Hansel, St. Louis.—p. 457.
Skin Testing Methods: Multiple Single Sitting versus Serial Small Group Tests. O. Swineford Jr., University, Va.—p. 470.
Oral Immunization for Poison Ivy Dermatitis. L. Zisserman, Philadelphia.—p. 474.
Comparative Study of Incidence of Acute Infectious Diseases in Allergic and Nonallergic Persons. W. T. Vaughan and V. J. Derbes, Richmond, Va.—p. 477.
Flour Allergy and Epithelial Hypersensitiveness to Ammonium Persulfate in Bakers and Millers. H. A. E. von Dishoeck, Amsterdam, The Netherlands, and D. J. Roux.—p. 481.
Asthma from Insect Emanations: Report of Case Due to Moths. E. Urbach and P. M. Gottlieb, Philadelphia.—p. 485.

Journal of Aviation Medicine, St. Paul

12:181-272 (Sept.) 1941

*Consideration of Effects of Oxygen Lack of Cardiovascular System from Viewpoint of Aviation, with Analysis of Deaths Occurring Aloft on Commercial Aircraft. A. Graybiel, Boston.—p. 183.
Use of Tilt Table Test in Aviation Medicine. A. Graybiel and R. A. McFarland, Boston.—p. 194.
Medical Aspects of Air Raid Casualties and Air Raid Precautions and Treatment. C. L. Maxwell, Mitchell Field, N. Y.—p. 212.
Differences in Judgment of Depth Perception Between Stationary and Moving Objects. R. Y. Walker, Columbus, Ohio.—p. 218.
Intelligence Testing of Flying Cadet Applicants: Report on Psychometric Measurement. W. A. Carlson, Randolph Field, Texas.—p. 226.
The Small District Examiner's Neuropsychic Problem. G. S. Backenstoe, Emmaus, Pa.—p. 230.
What Constitutes Neurocirculatory Asthenia? Description of Two Types. S. L. Immerman, Philadelphia.—p. 236.
New Precision Pipet for Volumetric Gaseous Analysis. E. Simonson, Milwaukee.—p. 240.

Effects of Oxygen Lack on Cardiovascular System.—Graybiel states that the symptoms and associated changes in circulatory dynamics which may appear in the person with a normal heart under conditions of civil or military aviation are not indicative of heart failure but merely adjustments or compensatory reactions to oxygen deficiency. The normal heart is not damaged, but anoxemia can precipitate heart failure in patients with heart disease. Pain of cardiac origin and specific symptoms of heart failure (dyspnea, weakness and collapse) have been encountered occasionally. Congestion of the lungs has been observed occasionally and arrhythmias rarely. The experience of a number of investigators with patients with coronary disease and angina pectoris shows that exposure to low oxygen tensions does not produce pain in patients who do not suffer from angina pectoris, even though coronary disease and healed myocardial infarction are present. The author's experience with 4 patients with severe coronary disease and angina pectoris subjected to a simulated altitude of 14,500 feet for forty-five minutes confirms this view. To determine the incidence of serious cardiac illness or death among passengers the author analyzed the information from five major commercial airlines, which have carried more than seven million passengers; approximately one and one quarter million passengers were carried by planes which rarely flew higher than 10,000 feet,

and the remaining passengers were carried by planes which at times flew between 10,000 and 15,000 feet and occasionally even higher. Only 3 deaths, ascribed to heart failure, occurred aloft. Death occurred in 5 passengers shortly after deplaning, in 2 of them from heart failure. Deaths of passengers taking place shortly after deplaning must be few, because otherwise the airline insurance departments would be involved. There is a record of 4 passengers in whom angina pectoris developed and was controlled with oxygen and amyl nitrite and of 1 suffering from coronary occlusion at an altitude of 18,000 feet who recovered without additional oxygen. According to Colonel Tuttle, of the United Air Lines, during three years oxygen was given to 1,415 of 1,084,190 passengers on the advice of their physicians or because of "evidence of anoxemia" at some time during the flight. Persons with well compensated heart disease need not hesitate to fly at the highest altitudes now flown in commercial aviation, provided additional oxygen is used, but persons with severe valvular disease, easily provoked angina pectoris or recent congestive failure and the old and feeble should be advised against traveling by air.

Journal of Experimental Medicine, New York

74:1-104 (July) 1941

Histologic Changes Following Ovariectomy in Mice: I. Dba High Tumor Strain. Elizabeth Fekete, G. Wolley and C. C. Little, Bar Harbor, Maine.—p. 1.

Inquiry into Structural Conditions Affecting Fluid Transport in Interstitial Tissue of Skin. P. D. McMaster, New York.—p. 9.

Method to Determine Peripheral Arterial Blood Pressure in Mouse. P. D. McMaster, New York.—p. 29.

Swine Lungworm as Reservoir and Intermediate Host for Swine Influenza Virus: I. Presence of Swine Influenza Virus in Healthy and Susceptible Pigs. R. E. Shope, Princeton, N. J.—p. 41.

Id.: Transmission of Swine Influenza Virus by Swine Lungworm. R. E. Shope, Princeton, N. J.—p. 49.

Constituents of Elementary Bodies of Vaccinia: IV. Demonstration of Copper in Purified Virus. C. L. Hoagland, S. M. Ward, J. E. Smadel and T. M. Rivers, New York.—p. 69.

Effect of Virus: Host Cell Relationship on Infection with Vaccinia. D. H. Sprunt, Durham, N. C.—p. 81.

Cardiac Factor in "Pressor" Effects of Renin and Angiotonin. W. H. P. Hill and E. C. Andrus, Baltimore.—p. 91.

74:105-166 (Aug.) 1941

Chemical Studies on Bacterial Agglutination: VI. Agglutinin Content of Antiserums to Hemolytic Streptococci. S. D. Henriksen and M. Heidelberger, New York.—p. 105.

Influence of Age on Susceptibility and on Immune Response of Mice to Eastern Equine Encephalomyelitis Virus. Isabel M. Morgan, New York.—p. 115.

Constituents of Elementary Bodies of Vaccinia: V. Flavin Associated with Purified Virus. C. L. Hoagland, S. M. Ward, J. E. Smadel and T. M. Rivers, New York.—p. 133.

Second Attacks of Poliomyelitis: Experimental Study. H. A. Howe and D. Bodian, Baltimore.—p. 145.

74:167-296 (Sept.) 1941

Capacity of Renal Vascular Bed in Hypertension. A. J. Cox Jr. and W. Dock, San Francisco.—p. 167.

Capacity of Coronary Bed in Cardiac Hypertrophy. W. Dock, San Francisco.—p. 177.

Myohemoglobinuria: Study of Renal Clearance of Myohemoglobin in Dogs. C. L. Yuile and W. F. Clark, Rochester, N. Y.—p. 187.

Tubular Factor in Renal Hemoglobin Excretion. C. L. Yuile, J. F. Steinman, P. F. Hahn and W. F. Clark, Rochester, N. Y.—p. 197.

Behavior of Pox Viruses in Respiratory Tract: IV. Nasal Instillation of Fowl Pox Virus in Chickens and in Mice. J. B. Nelson, Princeton, N. J.—p. 203.

Observations on Infection of Chick Embryos with Bacterium Tularense, Brucella and Pasteurella Pestis. G. J. Buddingh and F. C. Womack Jr., Nashville, Tenn.—p. 213.

Roentgen Radiation of Papilloma Virus (Shope): II. Effect of X-Rays on Papilloma Virus in Vitro. J. T. Syverton, G. P. Berry and S. L. Warren, Rochester, N. Y.—p. 223.

Renal Hypertension Produced by Amino Acid. R. J. Bing and Marjorie B. Zucker, New York.—p. 235.

Immunologic Specificity of Material Sedimentable at High Speed Present in Normal and Tumor Tissues. J. Furth and E. A. Kabat, with assistance of J. Brundage and Mary C. Boon, New York.—p. 247.

Neutralization of Agent Causing Leukosis and Sarcoma of Fowls by Rabbit Antiserums. E. A. Kabat and J. Furth, New York.—p. 257.

Further Studies of Infectious Unit of Vaccinia. R. F. Parker, L. H. Bronson and R. H. Green, Cleveland.—p. 263.

Endocrine Function of Surgically Reduced Pancreas. B. A. Houssay, V. G. Foglia and F. S. Smyth, Buenos Aires, Argentina, South America.—p. 283.

Journal of Infectious Diseases, Chicago

69:1-96 (July-Aug.) 1941

Effect of Pectin, Galacturonic Acid and Alpha Methyl Galacturonate on Growth of Enterobacteriaceae. J. E. Steinhaus and C. E. Georgi, Lincoln, Neb.—p. 1.

Oral Lesions Associated with Dietary Deficiencies in Monkeys. O. D. Chapman and A. E. Harris, Syracuse, N. Y.—p. 7.

Animal Inoculations with Pure Cultures of Trichomonas Vaginalis and Trichomonas Foetus. R. E. Trussell, Iowa City, and S. H. McNutt, Ames, Iowa.—p. 18.

Sylvatic Plague Studies: I. Convenient Individual Mouse Jar. J. R. Douglas and C. M. Wheeler, San Francisco.—p. 29.

Study of Asterococcus Muris (Streptobacillus Moniliformis): I. Morphologic Aspects and Nomenclature. F. R. Heilman, Rochester, Minn.—p. 32.

Id.: II. Cultivation and Biochemical Activities. F. R. Heilman, Rochester, Minn.—p. 45.

Study of Actinobacillus Lignieresi from Sheep Affected with Actinobacillosis. E. A. Tunnicliff, Bozeman, Mont.—p. 52.

Frequency of Occurrence of Salmonella Species. S. Bornstein, I. Saphra and L. Strauss, New York.—p. 59.

Studies on Measles: III. Use of Tissue Culture in Propagation of Measles Virus. G. Rake, M. F. Shaffer and Helen P. Jones, New Brunswick, N. J.—p. 65.

Studies on Inactivation of Diphtheria Toxin by Vitamin C (*l*-Ascorbic Acid). C. W. Jungeblut, New York.—p. 70.

Synthetic Medium for Cultivation of Streptococcus Fecalis. Roslyn L. Schuman and M. A. Farrell, State College, Pa.—p. 81.

Respiration of Malaria Plasmodia. J. Maier and L. T. Coggeshall, New York.—p. 87.

Journal-Lancet, Minneapolis

61:303-344 (Aug.) 1941

Some Diseases of Lower Part of Genital Tract. M. C. Piper, Rochester, Minn.—p. 333.

Space Thinking and Time Thinking. J. Sundwall, Ann Arbor, Mich.—p. 337.

61:345-392 (Sept.) 1941

Late Effects of Toxemias of Pregnancy. J. H. Moore, Grand Forks, N. D.—p. 368.

Fractures of Fingers. E. D. Lamb, Klamath Falls, Ore.—p. 372.

History and Development of Student Health Programs in Colleges and Universities. J. E. Raycroft, Princeton, N. J.—p. 375.

Journal of Urology, Baltimore

46:355-566 (Sept.) 1941. Partial Index

Tuberculoma of Kidney: Report of Case. H. G. Bugbee, New York.—p. 355.

Role of Liver and Thyroid as Metabolic Factors in Production of Renal Calculi. W. J. Ezickson and L. M. Morrison, Philadelphia.—p. 359.

Localized Obliterating Pyelonephritis. J. A. Hyams and H. R. Kenyon, New York.—p. 380.

*Endometrioma of Ureter. A. Randall, Philadelphia.—p. 419.

Sulfathiazole and Sulfadiazine in Treatment of Gonococcic Infections of Chorioallantoic Membrane of Chick. F. B. Bang and Betsy G. Bang, Nashville, Tenn.—p. 427.

Magnesium Sulfate Intravenously in Preoperative Treatment of Uremia or Decreased Kidney Function. J. C. Negley, Glendale, Calif.—p. 431.

Coronary Insufficiency and Operative Risk. I. Wills, Santa Barbara, Calif.—p. 475.

Ureteral Strictures in Relation to Hypertension. J. W. Pennington, Phoenix, Ariz.—p. 491.

Care of Bladder at Front When Paralyzed by Injuries to Spinal Cord. F. Hinman, San Francisco.—p. 499.

Contracted Bladder Neck, Frequent Result of Youth Delinquency. J. R. Dillon, San Francisco.—p. 510.

Roentgen Demonstration of Prevesical Spaces. B. Strauss, San Francisco.—p. 520.

Extraperitoneal Rupture of Bladder in Transurethral Prostatectomy. M. L. Polse, San Francisco.—p. 528.

Gonococcic Pyelonephritis: Complication of Renal Tuberculosis. J. A. May, San Diego, Calif.—p. 535.

Perirenal Abscess with Gas Formation and Metastatic Pulmonary Abscesses Due to Friedländer's Bacillus: Case Report. L. Kindall, Oakland, Calif.—p. 555.

Use of Powdered Sulfanilamide in Infected Genitourinary Wounds. C. D. Donahue, Eugene, Ore.—p. 562.

Endometrioma of Ureter.—Randall states that a careful review of the literature failed to reveal a case of intraureteral endometrioma. He thinks that heretofore such growths have masqueraded as primary ureteral neoplasms. He reports such a case in the hope that such an eventuality will be thought of and that when it is recognized radical surgical intervention will be avoided. He points out that the cyclic occurrence of intensified symptoms, especially hematuria, in a woman in her fourth decade should always arouse suspicion. Such patients should always be examined for the possible presence of pelvic endometriosis.

Kentucky Medical Journal, Bowling Green

39:265-308 (Aug.) 1941

Clinical Consideration of the Climacterium. L. W. Zimmerman, Louisville.—p. 270.
Virgil Pendleton Gibney. D. C. Patterson, Bridgeport, Conn.—p. 276.
Prostatism. W. V. Pierce, Covington.—p. 279.
Spontaneous Pneumothorax. R. J. Griffin, Lexington.—p. 284.
Influence on Public Health Progress of Inadequate Medical Services in Rural Population. C. B. Crittenden, Louisville.—p. 289.
Problems in Hematologic Diagnosis. L. Hamman, Baltimore.—p. 295.

39:309-368 (Sept.) 1941

A. M. A. Meeting at Cleveland, June 2-6, 1941. M. Casper, Louisville.—p. 354.
Results of Sobisminol Mass Administered Orally. J. R. Pate, Louisville.—p. 360.

Laryngoscope, St. Louis

51:607-738 (July) 1941

Vitamins and Eye, Ear, Nose and Throat. I. H. Jones, Los Angeles.—p. 609.
Vitamins and the Ear. W. P. Covell, Los Angeles.—p. 683.
American Otologic Society: Presidential Address. G. M. Coates, Philadelphia.—p. 692.
Use of Temporary Inexpensive Bite Block to Determine Relationship of Closed Bite and Temporomandibular Joint Symptoms. F. Woodward, Charlottesville, Va.—p. 698.
Von Recklinghausen's Disease in Otology. C. H. Smith, New York.—p. 705.
Otosclerosis with Unusual Pathologic Findings. M. F. Jones, New York.—p. 714.
Atypical Facial Neuralgia. G. H. Hyslop, New York.—p. 719.

18:739-820 (Aug.) 1941

Rhinology in Children, Résumé of and Comments on Literature for 1940. D. E. S. Wishart, Toronto, Canada.—p. 739.
Chemotherapy of Tuberculous Otitis Media. F. R. Spencer, R. W. Whitehead, W. C. Black and G. J. Duffner, Denver.—p. 773.
Influence of Nasopharyngeal Hyperplasia on Ear: Histologic Examination of Hyperplastic Lymph Follicles After Irradiation. H. P. Schenck, Philadelphia.—p. 780.
Surgery of Auricle, Including Total Reconstruction and Protuberant Ears. G. H. Cox, New York.—p. 791.
Experimental Observations on Question of Auditory Fatigue. H. G. Kobrak, J. R. Lindsay and H. B. Perlman, Chicago.—p. 798.
Suppurative Alveolitis and Its Effect on Maxillary Sinus. S. Rabkin, Cincinnati.—p. 811.

Medical Annals of District of Columbia, Washington

10:319-370 (Sept.) 1941

Mental Hygiene and Psychiatry. P. J. Ewerhardt, Washington.—p. 319.
Venereal Disease Control Through Public Health Facilities. W. K. Angevine, Washington.—p. 323.
Normal Electrostethogram. J. R. Cavanagh and H. B. Gwynn, Washington.—p. 326.
Acute Hematogenous Osteomyelitis. G. W. Leadbetter, Washington.—p. 331.
Cleidocranial Dysostosis: Report of Case. L. F. Cooper, Washington.—p. 334.

New England Journal of Medicine, Boston

225:351-390 (Sept. 4) 1941

Tufts Postgraduate Medical Program. S. Proger, Boston.—p. 351.
*Chlorosis. I. Olef, Boston.—p. 358.
Imperforate Hymen with Hematocolpos. S. O. Hoerr, Boston.—p. 365.
Significance of History of Asthma with Reference to Serotherapy. D. D. Rutstein, E. S. Rogers and Isabel McCaffrey, Albany, N. Y.—p. 368.
War Medicine, with Special Emphasis on Use of Blood Substitutes. C. A. Janeway, Boston.—p. 371.

Chlorosis.—Olef believes that one of the factors responsible for the apparent rarity of chlorosis is the allocation of many mild and some severe cases into the categories of nutritional or microcytic anemia with achlorhydria. Chlorosis is probably not as rare as is implied. During the last four years he has encountered 8 such patients who presented no clinical or laboratory evidence of acute, recurrent or chronic infections, severe visceral disease or abnormal blood loss. The anemia in chlorosis is of the hypochromic microcytic type; and, since histamine anacidity or hypoacidity is a common observation, it is probably a deficiency disease conditioned by a gastrointestinal disorder. In chlorosis, the erythrocytes are hypochromic, small and flattened. Quantitatively the thrombocytes are normal or increased. In other types of anemia the platelets are reduced and rise with improvement of the anemia, but in chlorosis there is an inverse relation between the platelet level (when elevated above normal) and the hemoglobin value. When thrombocytosis is at all present, it is well defined. Iron therapy cures the disease. The author suggests that the term "chlorosis" be discarded and that the disease should be more appropriately called "hypochromic iron-deficiency anemia of adolescence, frequently associated with achlorhydria."

225:393-432 (Sept. 11) 1941

Mosaic of Androgyny: Maleness Within the Female and Femaleness Within the Male. G. Draper, New York.—p. 393.
Pneumonia in Massachusetts, 1900-1940. D. O'Hara, Boston.—p. 402.
*Frequency of Poliomyelitis in Pregnancy. W. L. Aycock, Boston.—p. 405.
Diabetes Mellitus. E. P. Joslin, H. F. Root and C. C. Bailey, Boston.—p. 410.

Poliomyelitis in Pregnancy.—Aycock points out that seasonal, climatic, familial and constitutional selectivities in the distribution of paralytic poliomyelitis among those exposed to the virus suggest differences in the persons exposed rather than to differences in exposure. Bulbar poliomyelitis following tonsillectomy and adenoidectomy suggests the mucosa of the upper part of the respiratory tract as the susceptible port of entry. The author cites 56 cases of poliomyelitis associated with pregnancy; 28 are from the literature and 28 from personal records. When the disease occurred during the pregnancy of 2 is not known, in 9 it occurred in the first, in 19 in the second and in 23 in the third trimester. Three cases occurred after delivery. Thus the latter months of pregnancy predominate, although the data for the first months may be discrepant. Collection data preclude statistical analysis, but it is estimated that the chance coincidence of the two conditions is roughly 1:1,000 cases of poliomyelitis and 1:50,000 pregnancies. In the Detroit outbreak in 1939, the estimated expectancy of coincidence of poliomyelitis in pregnancy was less than 1 case; 4 cases were observed. The suspected association with pregnancy, in view of accompanying alterations in mucous membrane due to estrogenic changes, suggests that autarceologic susceptibility to poliomyelitis may reside in the economy of estrogenic substance. To establish the frequency of poliomyelitis in pregnancy similar studies must be made in other outbreaks.

Radiology, Syracuse, N. Y.

37:261-390 (Sept.) 1941

Cholangiography, Fractional Method. W. S. Altman, Boston.—p. 261.
Gastrocolic Fistula: Report of Twelve Cases. M. Ritvo and E. J. McDonald, Boston.—p. 269.
Study of Gastrointestinal Tract of Children and Its Relation to the Adult. W. W. Wasson, Denver.—p. 277.
Roentgenologic Consideration of Normal Mucosa of Duodenum. M. Feldman, Baltimore.—p. 284.
Clinical Significance of Roentgenologic Findings of Small Intestine. S. A. Portis, Chicago.—p. 289.
Roentgen Findings in Alkaptonuric Ochronosis. M. M. Pomeranz, L. J. Friedman and I. S. Tunick, New York.—p. 295.
*Roentgen Therapy in Tuberculous Cervical Lymphadenitis. H. Hauser, Cleveland.—p. 304.
Effect of X-Ray Therapy for Closure of Epiphyses: Preliminary Report. D. Spangler, Dallas, Texas.—p. 310.
Roentgen Irradiation of Calcareous Deposits About Shoulder. L. W. Baird, Temple, Texas.—p. 316.
Treatment of Peritendinitis Calcarea in Shoulder Joint. I. Klein and I. S. Klemes, New York.—p. 325.
Milliammeters at Ground Potential in X-Ray Tube Circuits. L. D. Marinelli, New York.—p. 331.
Note on Distribution of Surface Radiation from Million Volt Generator. M. C. Reinhard and H. L. Goltz, Buffalo.—p. 335.
Some Recent Contributions of Physics and Engineering Research to Radiology. B. Cassen, East Pittsburgh, Pa.—p. 338.
Misplaced Spinal Lipiodol: Analysis of 104 Lipiodol Spinograms. W. B. Hamby, Buffalo.—p. 343.
Pathologic Dislocations at Atlantoaxial Joint: Unusual Complication of Rheumatic Fever. W. A. Evans Jr., Detroit.—p. 347.
Roentgen Diagnosis of Intrauterine Hydrocephalus. R. Torpin and L. P. Holmes, Augusta, Ga.—p. 351.

Roentgen Therapy in Lymphadenitis.—Hauser treated 108 consecutive cases of tuberculous cervical lymphadenitis with roentgen irradiation. The following physical factors were used: The kilovolt potential was 200, with 0.75 mm. of copper and 2 mm. of aluminum filtration, a target-skin distance of 50 cm., a fractional dose of 150 r every ten days for a period of one hundred days, or a total dose of 1,500 r. If 20 milliamperes of current is used, the output amounts to 35 r per minute. When the lesions are bilateral, 100 r is applied to each side of the neck at the same sitting. The time-intensity factor precludes any possibility of cutaneous damage even if

the treatments were to be repeated. In only 1 of the author's patients did atrophy and telangiectasis develop after four courses of treatment during two and a half years. Regardless of the rate of response, a total of ten treatments was given. Of the 108 patients 14 were excluded because they received only one or at most two treatments. Of the 94 remaining patients 67 per cent received a course of ten exposures. A satisfactory follow-up observation lasting from a few months to seven years was had for 87; 7 have been lost track of. Of the 87 patients 77 (88.5 per cent) had satisfactory results and 10 (11.5 per cent) were considered unsuccessfully treated. Results were considered satisfactory when lesions regressed from 50 to 100 per cent either during the course of treatment or within a few months after the last exposure, when symptoms (pain, tenderness or draining sinuses) were relieved and when the deformity disappeared or was negligible. All other results were considered unsatisfactory.

Rhode Island Medical Journal, Providence

42:161-180 (Sept.) 1941

Carcinoma of Right Colon: Its Diagnosis and Principles of Treatment. L. S. McKittrick, Boston.—p. 161.
Present Status of Our Knowledge Concerning Sulfadiazine. W. J. Doyle, Providence.—p. 166.

South Carolina Medical Assn. Journal, Florence

37:233-266 (Sept.) 1941

Thyroid Disease. F. H. Lahey, Boston.—p. 233.
Low Back Pain and Sciatica Caused by Faulty Mechanics at Lumbosacral Area. G. R. Dawson, Charleston.—p. 242.
Conjunctival Plastic Operation in Cases of Hypotonia from Filtering Operations or Ocular Fistulas. J. B. Workman Jr., Columbia.—p. 249.

Southern Medical Journal, Birmingham, Ala.

34:899-1020 (Sept.) 1941. **Partial Index**

Accidents in Renal Surgery. N. F. Ockerblad and H. E. Carlson, Kansas City, Mo.—p. 899.
Deaths from Acute Appendicitis in Louisville. G. Aud, Louisville, Ky.—p. 914.
Medical Treatment of Hypertension. M. Flexner, Louisville, Ky.—p. 916.
Acute Atrophy of Liver Associated with Pregnancy: Report of Two Cases, One Terminating by Recovery. E. T. Ellison, Greenville, Miss.—p. 938.
Therapy of Lymphogranuloma Venereum. R. Brandt and R. B. Greenblatt, Augusta, Ga.—p. 941.
Spontaneous Subarachnoid Hemorrhage. C. C. Turner, Memphis, Tenn.—p. 949.
Headaches. P. Mahoney and J. S. Agar, Little Rock, Ark.—p. 956.
Sympathetic Ophthalmia: Some Remarks Concerning Its Etiology, Diagnosis and Treatment: Case Reports. W. D. Gill, San Antonio, Texas.—p. 959.
Syphilis Control Program in Mississippi. P. T. Erickson and D. V. Galloway, Jackson, Miss.—p. 976.
Hay Fever Plants of the South. R. P. Wodehouse, Yonkers, N. Y.—p. 986.
Statistics on Lobar Pneumonia. W. L. Cooke, Charleston, W. Va.—p. 1000.
Use of Progesterone in Nervous Tension States. L. A. Gray, Louisville, Ky.—p. 1004.
Limitations of Estrogen Therapy. W. O. Johnson, Louisville, Ky.—p. 1006.

Tennessee State Medical Assn. Journal, Nashville

34:337-376 (Sept.) 1941

*Benzedrine Sulfate in Obesity. R. B. Chrisman Jr. and W. Maury Jr., Memphis.—p. 337.
Report of Use of Pentothal Sodium as Intravenous Anesthetic. W. L. Poole, Johnson City, and C. H. Long, New Orleans.—p. 340.
Study in Thyroid Heart Disease with Notes on Masked Hyperthyroidism. P. H. Livingston, Chattanooga.—p. 344.
Some Notes on Neurology of Children. W. de Gutierrez-Mahoney, Nashville.—p. 352.
Diabetes Mellitus—Low Index of Suspicion, Methods for Control. H. C. Long, Knoxville.—p. 358.

Amphetamine Sulfate in Obesity.—Chrisman and Maury selected 27 obese patients for treatment with amphetamine sulfate; all but 1 were women, 21 of whom were being treated for various gynecologic disorders and the others for "uncomplicated" obesity. All had previously but unsuccessfully attempted weight reduction through diet. Thyroid had been given to 11; in 9 it had failed to cause weight loss, and 1 of the 2 in whom it was effective was sensitive to it. The original dose of amphetamine sulfate was 5 mg. a day, 2.5 mg. being given fifteen to thirty minutes before breakfast and before lunch. The dose was increased by 2.5 mg. every fourth day, but it never exceeded 20 mg. Other medication was given when indicated, but only 1 patient was also given thyroid. Dietary restriction was not imposed. The weight loss during amphetamine therapy ranged from 0 to 30 pounds (13.6 Kg.), with an average of 14 pounds (6.3 Kg.). The average rate was 2 pounds (1 Kg.) per week. The greatest loss, as well as the greatest inhibition of appetite, usually occurred between the second and fifth weeks. Fat disappeared chiefly from the abdomen and hips. Most patients lost their desire to "nibble" or overeat. There were only two failures. These occurred in uncooperative patients who suffered from nausea attributed to the medication, but it persisted after the drug was withdrawn. Other than the curtailment of appetite, the effect most frequently reported was a sense of well-being and increased energy. In a few instances dysmenorrhea was relieved. The weight of most patients remained fairly stationary on a maintenance diet after medication was discontinued. Placebos were given to 5 patients at the conclusion of treatment with amphetamine sulfate; 4 gained from 1½ to 6 pounds (0.7 to 2.7 Kg.) in five weeks, and 1 lost ¾ pound (0.3 Kg.). The drug, chiefly by virtue of its central action, appears to be a valuable aid in weight reduction.

Virginia Medical Monthly, Richmond

68:563-620 (Oct.) 1941

*Spirochetal Jaundice in Virginia, with Special Reference to Laboratory Diagnostic Methods. J. D. Reid and Rebecca A. Holt, Richmond.—p. 571.
Geriatrics and Its Role in Otology. J. A. Babbitt, Philadelphia.—p. 576.
Haverhill Fever Following Rat Bite. A. D. Hart Jr., Charlottesville.—p. 582.
Ovarian Pregnancy: Review of Literature and Case Report. R. B. Wilson, Philadelphia, and S. Robins, Richmond.—p. 585.
Cervical Fibromyositis and Headache. B. L. Boynton, Norfolk.—p. 587.
Choosing Method for Mass X-Raying of Service Men. N. Mercer, Philadelphia.—p. 589.
Fungicidal Effect of Sulfur Compounds Tested by New Method. F. J. von Gutfeld and F. W. Shaw, Richmond.—p. 592.
Use of Deproteinated Pancreas Extracts. M. J. Payne, Staunton.—p. 594.
Acute Intussusception. E. L. Kendig Jr., Richmond.—p. 596.
Place of Iodine in Treatment of Goiter: Analysis of 750 Cases. L. M. Bell, Winchester.—p. 599.
Multiple Myeloma: Report of Case. J. Flax, Richmond.—p. 605.

Spirochetal Jaundice in Virginia.—Reid and Holt report 4 cases of Weil's disease, bringing the total for Virginia up to 13. As the leptospira of the disease is more difficult to isolate and cultivate than most other pathogenic organisms, specialized laboratory procedures are essential for an accurate diagnosis. The authors emphasize the value of the leptospiral agglutination-lysis test. One of their patients was a bricklayer, 1 a pump operator and 2 picked chickens in a market. The living quarters of the 4 patients were such that rat-borne infections were possible but not probable.

War Medicine, Chicago

1:611-744 (Sept.) 1941

*Tuberculosis Among Selective Service Men in New York State. R. E. Plunkett, Albany, N. Y.—p. 611.
Training Medical Officers for War Duty: Work of United States Army's Medical Field Service School. E. E. Hune, Carlisle Barracks, Pa.—p. 624.
Experiment in Hospital Mobility. L. W. Johnson, Washington, D. C.—p. 646.
Amputations, Stumps and Prostheses. E. H. Carnes, Memphis, Tenn.—p 656.
Electrocardiographic Record System for Clinical and Statistical Purposes. A. E. Parsonnet, Newark, N. J.—p. 664.
*Diphtheria. K. R. Nelson, Washington, D. C.—p. 671.
Schizoid Personality and Schizophrenia. L. H. Bartemeier, Detroit.—p 675.
*Connective Tissue and Phagocytes in Experimental Gas Gangrene Infection in Guinea Pigs: Effect of Sulfanilamide. B. Kropp and Dorothy G. Smith, Kingston, Ont.—p. 682.
*Effect of Amphetamine (Benzedrine) on Fatigue of Central Nervous System. E. Simonson, N. Enzer and S. S. Blankstein, Milwaukee.—p. 690.
*Electrocardiography in Military Medicine, with Special Reference to Its Lack of Value in Study of Recruits. F. C. Wood, C. C. Wolferth and T. G. Miller, Philadelphia.—p. 696.

Tuberculosis in New York State.—According to Plunkett, to avert the possibility of introducing tuberculosis into the Army and to avoid the financial burden on the community that such an introduction would create, the following routine is

carried out in three New York state induction stations: Immediately after registration and before the physical examination is begun the selectee is sent to the roentgen ray department, an exposure of his chest is made and the film is developed and interpreted as soon as ready. A report of the interpretation is then submitted, usually before the medical examination is completed, to the medical officer in charge. If it is advisable to make another exposure the selectee is returned to the roentgen ray department before the record of his physical examination is completed. Another exposure is rarely necessary when the 14 by 17 inch (35.5 by 43.1 cm.) paper or 14 by 17 inch celluloid film is used, and when the 4 by 5 inch (10.1 by 12.7 cm.) film was used it was necessary for less than 5 per cent of the selectees at the Buffalo induction station. The following criteria are used in classifying the roentgen data for acceptance or disqualification of the selectees: (1) Chest normal includes all thoracic roentgenograms with no evidence of tuberculous infection, (2) chest normal includes roentgenograms indicative of a residual childhood infection, (3) chest positive embraces all thoracic roentgenograms showing evidence of the reinfection type of pulmonary tuberculosis and primary tuberculosis and (4) thoracic pathologic conditions needing clinical appraisal. The total number of men examined roentgenographically at the induction stations of Buffalo, Syracuse and Albany from Nov. 25, 1940 to March 14, 1941 was 14,923, and 127, or 0.9 per cent, of them were disqualified for military service because of roentgen evidence of tuberculosis and 21 men were disqualified because of thoracic pathologic conditions other than tuberculosis. Experience with the different available mediums for thoracic roentgenograms has led to the conclusion that until some cheaper and equally accurate method is developed the 4 by 5 inch roentgen photographic film is the most economical and most practical film for screening large groups of persons. Admission to the Army of men with active or potentially active tuberculosis represents a serious hazard to public health.

Diphtheria.—Nelson points out that for diphtheria antitoxin to be highly effective it must combine with the available toxin rapidly, and it must combine in firm bondage. An antiserum that exercises both of these qualities was first called an avid antitoxin by Kraus and Baecher in 1913. O'Meara stated that in Dublin, Ireland, the gravis type of organism, causing a hypertoxic diphtheria, is extremely prevalent and can be isolated from about 85 per cent of patients admitted to the Cork Street Fever Hospital, among whom the fatality rate is high despite early administration of maximal doses of the antitoxin now generally used. Antitoxin treatment of this hypertoxic diphtheria, it is pointed out, can meet with success only when the antitoxin available neutralizes without delay the all important substance B in the local lesion, halting its toxic onslaught, and when union between toxin and antitoxin is so firm that no dissociation follows the dilution of the mixture in the circulation. Finally, the antitoxin must withstand the addition to it of quantities of toxin rich in substance B without forfeiting its avidity. However, antitoxins in general use today are of low avidity. As yet avid serum rich in anti B factor cannot be produced at will, though attempts are being made. Reports are awaited which will show whether the gravis types of Corynebacterium diphtheriae, prevalent in areas where hypertoxic diphtheria predominates, may be used for the preparation of toxoids and antitoxins better adapted to its more effective immunization and treatment. O'Meara believes that avid antitoxin contains a considerable amount of anti B and anti A antibody, and that therefore it is therapeutically efficient for hypertoxic diphtheria in which both substances A and B are active.

Gas Gangrene Infection.—Kropp and Smith studied the effect on the connective tissue and phagocytes of experimental gas gangrene in guinea pigs and also the effect of sulfanilamide on such infection. The animals were infected according to the method used and described by Reed and Orr. The toxin of Clostridium welchi rapidly attacked and destroyed subcutaneous connective tissue and the phagocytic cells present in the connective tissue. The organisms and toxin spread chiefly along connective tissue planes. The accumulation and phagocytic activity of leukocytes and other phagocytic cells at the wound were inhibited by the toxin of Cl. welchi. Sulfanilamide introduced into the experimental gas gangrene wound partially overcame the inhibitory action of the infection on the migration of leukocytes and phagocytic cells of the connective tissue and the ability of histiocytes to phagocytose Cl. welchi.

Amphetamine and Fatigue.—Simonson and his co-workers determined the effect of amphetamine on fatigue of the central nervous system by measuring the fusion frequency of flicker. This method cannot be influenced by any voluntary effort. Sixty-two experiments were carried out with 6 subjects, twenty-four of them after the administration of 10 or 15 mg. of amphetamine. The fusion frequency was measured in the morning and late afternoon. The subjects performed their usual daily work (not manual). For the amphetamine experiments amphetamine sulfate was given before lunch. Some control experiments were performed with each subject with sodium bicarbonate. The fusion frequency of all subjects was definitely lower in all control experiments at the end of the working day. The decrease varied on different days, depending on the amount of work done and in general paralleling the subjective feeling of fatigue. In contrast to these data there was a slight increase of the fusion frequency in all experiments with amphetamine. None of the subjects felt tired on the days they had amphetamine. Thus the abolition of the sense of fatigue coincides with the increase of the excitability of at least the retinocortical system, as shown by the increase of the fusion frequency, and probably of the whole central nervous system. In 5 of the subjects 10 mg. of amphetamine sulfate produced no subjective effect other than abolition of fatigue. One subject felt fresh at the end of the working day but complained of drowsiness in the evening and sleeplessness in the night. It was not possible to repeat the experiment with a smaller dose. All absolute values of fusion frequency were higher in the afternoon on the days when amphetamine was used than they were on control days. The increase of fusion frequency after amphetamine had been taken did not depend on the absolute value of the fusion frequency in the morning. Therefore it seems that amphetamine increases the excitability of the central nervous system independently of its state of fatigue and excitability at the time when amphetamine is given.

Electrocardiography.—Wood and his colleagues discuss the probable value of electrocardiography in military medicine, based on the data of the electrocardiograms of 705 unselected students, 153 students with definite or suspected heart disease (whose age corresponds to that of army recruits) and 229 unselected corporation executives (whose age corresponds to that of army officers). The authors' conclusions are: In persons less than 30 electrocardiography does not demonstrate cardiac abnormalities of importance from the military standpoint which are not discoverable on physical examination. In young persons in whom heart disease is present or is suspected electrocardiography rarely adds further significant information. Finally, electrocardiography may confuse the issue by revealing minor abnormalities in persons who have no cardiac lesion of military significance. In persons more than 30 and especially in those more than 40 electrocardiography may occasionally demonstrate degenerative heart disease while the physical symptoms or signs are still not definite. In the latter age group study of a person with cardiac pain or with cardiac arrhythmia is incomplete without an electrocardiographic tracing. However, even in these older persons the electrocardiogram may confuse the issue more often than it clarifies it unless the examiner is aware of the frequent occurrence and relative insignificance of certain questionable electrocardiographic abnormalities and unless he has a clear conception of the characteristics of definitely abnormal electrocardiographic patterns.

West Virginia Medical Journal, Charleston

37:433-480 (Oct.) 1941

Important Newer Concepts Concerning Cancer of the Intestines and Their Bearing on Management. J. A. Bargen, Rochester, Minn.—p. 433.
Choice of Anesthetics. G. J. Thomas, Pittsburgh.—p. 442.
Testing Hearing and Evaluation of Results in Mathematical Figures. C. E. Kinney, Cleveland.—p. 448.
Surgical Objectives. M. J. Payne, Staunton, Va.—p. 453.
Differentiation of Genitourinary and Gastrointestinal Pathology. J. F. McCuskey, Clarksburg.—p. 457.
Medical Library of West Virginia University. G. S. Dodds, Morgantown.—p. 462.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:323-364 (Sept. 6) 1941

The Future of Medical Education as Seen by a Teacher. J. A. Ryle.—p. 323.
The Future of Medical Education: A Medical Student's View. D. McDonald.—p. 327.
Clinical Observations on Air Raid Casualties. R. T. Grant and E. B. Reeve.—p. 329.
Memorandum on Observations Required in Cases of Wound Shock. R. T. Grant.—p. 332.

2:365-392 (Sept. 13) 1941

Survey of 100 Cases of War Neuroses. J. D. Sutherland.—p. 365.
Fragarine: Inhibitor of Uterine Action (Preliminary Communication). B. Whitehouse.—p. 370.
Some Contributions to War Surgery from the Soviet Union. R. Clarke.—p. 372.
*Reduction of Hospital Infection of Wounds: Controlled Experiment. W. McKissock, Joyce Wright and A. A. Miles.—p. 375.

Reduction of Hospital Infection of Wounds.—According to McKissock and his collaborators, during a preliminary observation of four months the incidence of hospital infection with Streptococcus pyogenes among head wounds in a neurosurgical unit was 10, or 31.3 per cent, in 32 air raid casualties, and 2, or 4.4 per cent, in 46 "clean" operative cases. After an improved dressing technic and a partially revised general ward procedure were instituted the incidence of hospital infection with Str. pyogenes was 1, or 2.2 per cent, in 46 air raid casualties and zero in 49 "clean" operative cases. The dressing technic was designed on the assumption that the main cause of hospital infection is the carriage of infected discharge from the wounds of 1 patient to the wounds of another patient by members of the medical and nursing staff. Air contamination and droplet infection was considered less important. With the addition of bins for dirty dressings with foot action lids the dressing team can be reduced to a minimum of three: The dresser who begins his work when the bandage and outer dressings have been removed from the wound and is assisted by the "dirty nurse." He applies the new bandage after which he washes his hands and forearms. The "clean nurse" looks after the trolley and its contents only, touching nothing throughout the entire dressing round. The "dirty nurse" removes the outer dressings and stands by until she assists in applying the final new bandage, after which she washes her hands and forearms. The bin porter takes care of two bins (one for washable soiled dressings and the other for dressings which must be destroyed). He washes his hands and forearms only at the beginning and the end of a round of dressings. All ward cleaning and bedmaking were finished half an hour before dressings were started. No more than one dressing was uncovered at one time. No person having an infected lesion of the hand or a sneezing cold was permitted to dress wounds.

Lancet, London

2:301-330 (Sept. 13) 1941

Preparation of Alum Precipitated Toxoid for Use as Immunizing Agent. M. Barr, C. G. Pope, A. T. Glenny and F. V. Lingood.—p. 301.
*Liver Extract in Treatment of Tropical Macrocytic Anemia. H. C. Trowell.—p. 303.
Simple System of Splinting for Lower Limb. I. S. Smillie.—p. 304.
Pulmonary Moniliasis, with Primary Bronchogenic Pneumonia. J. K. McCollum.—p. 306.
Wasp Sting as Immediate Cause of Death. S. C. Dyke.—p. 307.
Pfeiffer Bacillus Meningitis: Recovery with Chemotherapy. J. T. Harold.—p. 308.
*Blood Amino Acids in Hematemesis. D. A. K. Black.—p. 309.
*Anginal Symptoms Arising from Hypothyroidism. H. Zondek.—p. 310.
Intestinal Damage from Small Wound. L. A. Ledingham.—p. 311.

Liver Extract for Tropical Macrocytic Anemia.—Trowell found a crude liver extract (from British drug houses) to be satisfactory in the treatment of 2 patients with uncomplicated tropical macrocytic anemia. The weekly dose of the extract varied from 5 to 10 cc. The author believes that this less expensive crude liver extract may prove more effective in the treatment of macrocytic anemia than the refined liver extracts which are potent in the treatment of pernicious anemia. He suggests that some fractions essential to the cure of tropical macrocytic anemia may be lost in the refining process.

Blood Amino Acids in Hematemesis.—Black determined the amount of amino acid nitrogen in the blood of 7 patients with azotemia secondary to gastroduodenal hemorrhage. The data show an increase in amino acid nitrogen at the time of bleeding, the average being 15.2 mg. per hundred cubic centimeters. This increase is especially striking in view of the anemia which most of the patients had, since the amino acid content of plasma is only about a fifth of that of the erythrocytes, and low amino acid values might have been expected. The amino acid nitrogen level fell gradually as recovery took place. While a general correspondence existed between urea and amino acid values, the blood urea level was not necessarily highest at the same time as the amino acid nitrogen level. The increase in amino acid nitrogen probably indicates hepatic dysfunction, though this is slight compared with the renal impairment. This disparity may be due to the greater importance of circulatory factors in renal function.

Anginal Symptoms Arising from Hypothyroidism.—Zondek suggests that the possibility of hypothyroidism be kept in mind when patients with anginal symptoms are being treated. There are a number whose condition can be related to hypothyroidism. The main signs are a tendency to cardiac dilatation (mostly in the form of a pointed, sometimes rounded, dilatation of the left ventricle), bradycardia and low blood pressure. The electrocardiogram often shows flattening of the P and T waves, and the T wave is sometimes negative. The PR interval is sometimes prolonged. These patients complain of pain or substernal distress and compression or sometimes only of troublesome precordial tightness. They often find it difficult to describe clearly what they feel. The sensations are more or less continuous, whereas true anginal attacks are rare. As in true myxedema, an increase in blood cholesterol is an early symptom. The capillaries appear constricted and reduced in number, and the circulation in them is slow. Usually small doses of thyroid (0.5 to 0.7 Gm. weekly) are effective. Treatment should be continued for several weeks with short interruptions and repeated when bradycardia reappears. The cardiovascular syndrome described may be designated abortive myxedematous heart. Unlike the symptoms of ordinary vagal heart (primary vagotonia) its symptoms and signs are little, if at all, affected by drugs that decrease the vagal tonus or cause vasodilatation.

Medical Journal of Australia, Sydney

2:131-156 (Aug. 9) 1941

Fear as a Factor in Disease. H. H. Turnbull.—p. 131.
Social Aspects of Medicine. J. Dale.—p. 135.
Some Problems of Medical Sociology. R. Mailer.—p. 140.

2:157-188 (Aug. 16) 1941

Periodontal Disease and Its Medical Aspects. G. Christensen.—p. 157.
Disuse Atrophy of Skeletal Muscle. J. C. Eccles.—p. 160.
Comparison of Effects of Disuse and Denervation on Skeletal Muscle. G. Reid.—p. 165.

2:189-216 (Aug. 23) 1941

Studies in Atmospheric Pollen. Marie E. Phillips.—p. 189.
Nature of Eclampsia. W. J. Penfold.—p. 198.
Use of Sulfonamide Compounds in Filarial Complications. K. V. Earle.—p. 200.

2:217-248 (Aug. 30) 1941

Studies in Tuberculosis: III. Symptomless Tuberculous Bacilluria as Observed in Subjects with Osseous and Pulmonary Tuberculosis. R. Webster.—p. 217.
Value of Immunization in Pertussis. D. Vickery.—p. 221.
Note on Cultivation of Hemophilus Pertussis. Phyllis M. Anderson.—p. 224.
Some Observations on Effect of Sedative Drugs on "Cardiazol" Convulsion. N. V. Youngman.—p. 224.

Bull. of Health Org., League of Nations, Geneva

9:247-370 (No. 3) 1940-1941

League of Nations Antiepidemic Work in China in 1939.—p. 247.
Preventive Vaccination of Dogs Against Rabies: Critical Review. R. Gautier.—p. 269.
Nutritional Research in the Union of South Africa. E. H. Cluver.—p. 327.
The Poor Rice-Eater's Diet. W. R. Aykroyd.—p. 342.
The Rice Problem. A. G. van Veen.—p. 357.

Annales Pædiatrici, Basel

157:65-128 (Aug.) 1941

Posology in Pediatrics. H. Mautner.—p. 65.
*Coronary Calcification and Thrombosis in an Infant. S. van Creveld.—p. 84.
*Influenzal Meningitis. H. Nathhorst.—p. 93.
Skimmed Milk Acidified with Lactic or Citric Acid as Substitute for Buttermilk. H. Scheidegger.—p. 101.

Coronary Calcification and Thrombosis in Infant.—Coronary thrombosis and calcification in young children raise the following questions. 1. Is there a relation between disease, intoxication or constitutional anomaly in the mother and the occurrence of arterial calcification and thrombosis in the infant? 2. Do these vascular changes help explain disturbances in respiration and circulation in cases of sudden death immediately or shortly after birth? Van Creveld discusses these questions in connection with the case of a girl aged 6 weeks who died during an attack of severe dyspnea five days after admission to the hospital. Necropsy disclosed coronary calcification and thrombosis. There was a peculiar swelling and necrosis of the capillary endothelium of the renal glomeruli. The child's mother had had bronchial asthma for some years, and during pregnancy she had made use of a prescription containing among other substances caffeine and lobeline. The hypothesis is advanced that the coronary lesions in the child were related to the allergic mother's use of drugs, giving rise to a localized hyperergic reaction.

Influenzal Meningitis.—Nathhorst reports data on 15 cases of influenzal meningitis observed at the children's hospital in Göteborg during the years from 1934 to 1940. During this period 118 cases of purulent meningitis were observed; cases of the influenzal (Pfeiffer's) form amounted to 11.8 per cent. The ages of the patients varied from 4 months to 10 years, but 11 were less than 2 years old. The author gives particular attention to the cases in which sulfanilamide or sulfapyridine was used. Specific serum therapy was not employed, although some patients were given serum (without complement) in small doses. Sulfapyridine was given in full doses to 6 children. The 2 oldest (aged 8 and 10 years) recovered. Of the children not treated with sulfapyridine only 1 was cured (aged 3½ years). With 1 exception, all the children who died were less than 2 years old. It seems that age is of greatest importance for the prognosis. Since the action of sulfapyridine is rather uncertain in influenzal meningitis, the author recommends that specific serotherapy be given in addition to it.

Schweizerische medizinische Wochenschrift, Basel

71:873-896 (July 26) 1941. **Partial Index**

*Etiology and Therapy of Threatening and Recurrent Abortion. R. Wenner.—p. 873.
Relationship of Carbohydrate and Potassium Metabolism and Action of Adrenal Cortex on It. F. Verzár.—p. 878.
Experiments on Biologic Action of Pathologic Cerebrospinal Fluid of Human Subjects in Tests on Plants. E. Katzenstein-Sutro and Helen Staub.—p. 879.
Tuberculosis of the Heart: Tuberculous Phlebitis of Myocardium. P. Alphonse.—p. 882.
Wood Gas Poisoning. A. Wüst.—p. 883.
Investigations During 100 Kilometer Marches in Officer Schools. A. Jung.—p. 884.

Threatening and Recurrent Abortion.—Wenner presents observations on 133 cases of threatening and habitual abortion that were observed at the Basel clinic from 1930 to 1939. Until 1936 the treatment was purely conservative, that is, it was limited to bed rest and sedatives; after 1936, however, corpus luteum therapy was used. In a few cases vitamin E was given in addition to the corpus luteum. Comparison of the therapeutic results reveals that those of conservative treatment are inferior to those obtained with corpus luteum. In evaluating the efficacy of the corpus luteum therapy, it must be considered that at first the doses were rather small; thus some of the failure of this therapy must doubtless be ascribed to insufficient dosage. From results obtained in recent years with adequate doses of corpus luteum the author concludes that it should never be dispensed with in the treatment of threatening or recurrent abortion. In cases of the latter condition therapy should be begun early, that is between the sixth and eighth week of pregnancy. Ten mg. of a corpus luteum preparation should be given every week by intramuscular injection, either 5 mg. given twice or 2 mg. given five times. If oral medication is preferred the dose must be from six to eight times as large. Because abortion is most likely at the time menstruation is due, bed rest is advised, and large doses are administered daily at these times. From the fifth to the seventh month of pregnancy the weekly dose is decreased to 2 mg. given twice a week by intramuscular injection. If abortion threatens in spite of this treatment, larger doses should be administered and the patients should remain in bed until the symptoms have subsided.

Arch. Argent. de Pediat., Buenos Aires

16:107-218 (Aug.) 1941. **Partial Index**

*Results of Splenectomy in Erythroblastic Anemia: Two Cases. M. Acuña.—p. 126.

Splenectomy for Erythroblastic Anemia.—Acuña observed 2 patients with erythroblastic anemia who had splenectomy performed. The operation was done when the patients were aged 10 months and 5 years; they lived up to the ages of 9 and 15 years, respectively. The immediate results of splenectomy were good. The crasis of the blood and the general condition improved, the appetite and weight increased and the complexion, the color of the skin and the aspect of the mucosa also improved. The good results lasted for one or two years, after which erythroblastic anemia reappeared and progressed slowly but constantly. The physical development of the patients was deficient, and puberty was retarded. The patients grew, for the few years they lived, with progressive anemia, osteoporosis and a feeble constitution.

Medizinische Welt, Berlin

15:549-576 (May 31) 1941

*Therapy of Epidemic Meningitis, Particularly with Sulfanilamide Derivatives: Report on 120 Cases. R. E. Mark.—p. 549.
Obstetric Injuries to Mother: Prevention and Therapy. E. Puppel.—p. 552.
*Autotransfusion, Particularly in Prophylaxis of Apoplexy. W. Kühn.—p. 557.
Myopia and Its Significance for Organ of Vision. H. Schulz.—p. 561.
Hippocratic Thought. P. Engelen.—p. 562.
Correct Application of Opium Law. W. Becker.—p. 563.

15:577-604 (June 7) 1941

Estimation of Renal Function. W. Nonnenbruch.—p. 577.
*Therapy of Epidemic Meningitis, Particularly with Sulfanilamide Derivatives: Report on 120 Cases. R. E. Mark.—p. 580.
*Commotio and Contusio Cerebri: Present Conception of Their Nature, Their Differentiation, Clinical Aspects, Therapy and Possible Sequels. F. Jaeger.—p. 583.
High Incidence of Myocardial Lesions Among This Year's Influenza Cases. F. Klewitz.—p. 587.
Therapy of Late Exudative Eczematoid. F. Buckreus.—p. 588.
Accident and Tuberculosis. O. Boden.—p. 590.

Treatment of Epidemic Meningitis.—Mark reports observations on 117 patients with epidemic meningitis, of whom 48 were treated with acetylsulfanilamide, 39 with sulfapyridine and 30 only with serum and spinal puncture. The mortality was 8.4, 7.7 and 53.5 per cent respectively. The fact that of the group of 30 treated with serum and puncture but without a sulfanilamide preparation 16, or more than half, died demonstrates that sulfanilamide and its derivatives have greatly decreased the mortality of epidemic meningitis. Sulfapyridine was administered by mouth, whereas acetylsulfanilamide was given intravenously, intraspinally and by mouth. Acetylsulfanilamide in a dose of 5 cc. of a 30 per cent solution was given intraspinally at the time of the diagnostic puncture. In addition two or three intravenous injections of 5 cc. each were given daily for five or six days. The intraspinal administration may be repeated on the second day. After the intravenous treatment acetylsulfanilamide therapy is continued orally for four to seven days (two tablets three times daily). In this form acetylsulfanilamide proved more effective than did sulfapyridine. There was not a single death among 13 patients in whom early intraspinal administration of acetylsulfanilamide was employed. There were no harmful after-effects. Determination of the

comparative efficacy of acetylsulfanilamide and sulfapyridine would necessitate alternate application of the two preparations on a large number of patients. Either preparation should be employed in every case of epidemic meningitis.

Autotransfusion in Prophylaxis of Apoplexy.—Kühn directs attention to the treatment of cerebral hemorrhage that was recommended by Colella and Pizzillo in 1934. These authors took 25 or 30 cc. of blood from a brachial vein, mixed it with a small amount of sodium citrate solution and injected it into the gluteal muscle. Autotransfusion had a hemostatic effect and proved helpful in cerebral hemorrhages and their sequels irrespective of their cause or nature. Kühn resorted to autotransfusion for 250 patients, whom he classifies into four groups. The 81 patients of the first group had had an apoplectic attack and a threatened relapse because of increased intracranial pressure. Autotransfusion reduced the incidence of recurrence as well as of death. The author employed it in the presence of increased intracranial pressure either with or without hypertension. In a second group of 3 patients the apoplexy was in the early stage. Autotransfusion was followed by great improvement. The third group comprising 110 patients includes those in whom unilateral paresthesias, vertigo, temporary motor pareses, unilateral tremor, abnormal sensations of heat and cold and temporary aphasic and visual disturbances indicates considerable organic changes and the threat of apoplexy. In nearly all these patients improvement was noticeable after autotransfusion, and apoplexy was prevented. A fourth group of 56 patients had dull pain in the occiput or forehead, vertigo, loss of memory, a feeling of congestion in the head, vascular crises and tinnitus aurium. In this group also autotransfusion was followed by improvement.

Cerebral Concussion and Contusion.—Jaeger argues that differentiation between cerebral concussion, contusion and compression is difficult and that it is advisable to classify all craniocerebral injuries into those requiring conservative treatment and those necessitating surgical intervention. Conservative treatment should be employed in simple cerebral concussion, in cases complicated by edema of the brain and in contusion. Symptoms of concussion are most severe immediately after the trauma and subside in several hours or days without leaving anatomic changes. If headache, vertigo and vomiting persist after the unconsciousness has subsided or if a single nerve is paralyzed or hemiplegia exists, edema is to be suspected. This necessitates repeated spinal punctures and dehydration of the brain by means of intravenous injection of a 50 per cent solution of dextrose. Contusion is characterized by prolonged loss of consciousness, which may be so severe that incontinence of all the sphincters results and that all reflexes become abolished. As the unconsciousness subsides, there is usually disorientation and occasionally motor unrest, nausea and vomiting. Paralytic symptoms exist, the intracranial pressure is always increased and the cerebrospinal fluid contains blood. If the symptoms increase, danger threatens. It is essential to make careful neurologic and roentgenologic examinations and to keep pulse rate, blood pressure and respiration under constant control. Exploratory trepanation may be necessary in doubtful cases, if no improvement is observable after several days of conservative treatment. Exploratory trepanation is the only means of differentiating contusion from cerebral hemorrhage. Large accumulations of blood under the dura should be removed.

Klinicheskaya Meditsina, Moscow

19:1-176 (No. 2) 1941. **Partial Index**

Classification of Clinical Types of Brucellosis. N. I. Ragoza.—p. 1.
Symptomatology and Course of Paratyphoid C. L. K. Korovitskiy, I. P. Drobinskiy and A. A. Shneerson.—p. 20.
Peritonitis of Bacillary Dysentery. S. I. Ratner.—p. 25.
Experimental Data on the Pathomorphology of Vaccine Encephalitis. M. S. Margulis.—p. 31.
*Sporadic Grip and Its Blood Picture. A. A. Korovin.—p. 69.

Blood Picture in Sporadic Grip.—Uncomplicated sporadic grip, according to Korovin, differs from the epidemic variety by a lesser contagiousness, the presence of chilling, the predominance of symptoms referable to the upper respiratory tract, the absence of severe prostration in the presence of a high temperature, frequent herpetic eruption and a favorable course. In 53 per cent of the cases of sporadic grip there was leukopenia, in 35 per cent a normal leukocyte count and in 12 per cent leukocytosis. Neutropenia was present between the second and the fifth day of the illness in the cases of uncomplicated grip, with leukopenia or a normal leukocyte count. Lymphopenia was present during the first two to three days and eosinopenia during the entire febrile period. The number of monocytes was either normal or slightly diminished. In cases of sporadic grip leukopenia is not as frequent as in cases of epidemic grip. Toxic and degenerative alterations of the neutrophils are less common and less pronounced. The essential difference, however, in the blood pictures produced by the two forms is the absence of monocytosis or of histiocytosis in the sporadic form. The latter is characteristic of epidemic grip. In cases of complicated sporadic grip the majority of the patients had neutrophil leukocytosis. Epidemic and sporadic grip are distinct disease entities which may be differentiated clinically, epidemiologically and in part on the basis of the blood picture. Isolated cases of the epidemic variety of grip are to be seen during an epidemic-free interval. The patients probably act as reservoirs of the epidemic virus.

Nordisk Medicin, Stockholm

11:2261-2304 (Aug. 2) 1941

Experiences with Salazopyrine. Nanna Svartz.—p. 2261.
Remarks on Treatment of Diabetes with Insulin and on Carbohydrate Tolerance. C. Sonne.—p. 2264.

Hospitalstidende

*Tendovaginitis or Peritendinitis Crepitans of Upper Extremity Treated with Roentgen Irradiation in Combination with Immobilization. A. Bertelsen.—p. 2267.
Case of Diabetic Coma Overcome Exclusively by Application of Isotonic Sodium Bicarbonate Solution. E. Kirk.—p. 2279.

Hygiea

Otosclerosis: Symptoms from Outer and Middle Ear. G. Holmgren.—p. 2281.
Morphologic Development of Bone Marrow in Fetus. N. G. Nordenson.—p. 2283.

Tendovaginitis Treated with Roentgen Irradiation and Immobilization.—Bertelsen states that freedom from symptoms resulted after an average of twenty-four days' treatment with combined roentgen radiation and immobilization in 83 cases of acute tendovaginitis or peritendinitis crepitans in which the treatment was begun from one to fourteen days after the onset of the disorder, in an average of thirty-two days in 19 cases of acute disease in which the treatment was started after two to six weeks, in an average of forty-two days in 15 cases of subacute disease in which treatment was given from one and a half to three months after the onset (1 case of subacute disease with particularly protracted course in which the treatment lasted eight months being excluded), in an average of forty-six days in 14 cases of subchronic disease in which admission took place after three to twelve months' duration of the disease and in an average of sixty days in 13 cases of chronic disease in which treatment was given after more than a year's duration of the disease, the time here varying greatly in the individual cases. The ability to work was restored after an average of five weeks in the cases of acute disease, after two to two and a half months in the cases of subacute and subchronic disease and as a rule after a still longer time in the cases of chronic disease. The author says that the frequency of recurrence and of chronic tendovaginitis or peritendinitis crepitans depends largely on the time of institution of the combined roentgen and immobilization treatment. Examination of 104 patients from one to ten years after treatment did not show recurrence, chronic tendovaginitis or peritendinitis in the 52 cases in which the treatment was begun during the first two weeks after the onset of the disease. The disorder became chronic in 1 of 15 patients with acute disease treated after two to six weeks, in 1 of 12 with subacute disease treated after one and a half to three months, in 5 of 15 treated after three to twelve months and in 4 of 13 treated after more than a year's time, and the conditions with regard to recurrence were similar.

Book Notices

Trauma and Disease. Edited by Leopold Brahdy, B.S., M.D., Physician in Charge of Occupational Diseases and Injuries in the Office of the Corporation Counsel of the City of New York, and Samuel Kahn, B.S., M.D., Medical Examiner in the Bureau of Workmen's Compensation of the Department of Labor, State of New York. Second edition. Cloth. Price, $7.50. Pp. 655, with 13 illustrations. Philadelphia: Lea & Febiger. 1941.

This volume includes eighteen chapters devoted to the relation of trauma to specific disease conditions, written by authors prominent in their respective fields. The first chapter, by Drs. Brahdy and Kahn, the editors, serves as an introduction to the general subject and presents fundamental principles for determining the relationship between trauma and disease.

The articles are written from the point of view of the medical expert; as indicated in the opening chapters, an attempt has been made to avoid introducing a predominant medicolegal influence. Certainly this book is "must" reading for any one going to court as a medical expert, a witness, or a lawyer in a case involving trauma and disease. It should be of great value to those interested in industrial medical problems, compensation commissions and the many physicians, lawyers and jurists who are called on to decide in given cases what the effects of trauma may be. Particularly noteworthy are the chapters on trauma and heart disease, by Drs. Paul D. White and R. Earle Glendy, on trauma and neoplasms, by Dr. Leila Charlton Knox and on trauma and mental disorders, by Drs. Franklin G. Ebaugh and John D. Benjamin. The chapter on trauma and diabetes mellitus is, appropriately enough, bound upside down in the volume reviewed, beginning on page 545 and ending on page 560. The chapter presents the little that is known on the relationship of trauma to the etiology of diabetes and it is apparent that this is appallingly little. To make up for this the chapter is rounded out or padded with miscellaneous information on the disease that belongs more properly in a textbook on diabetes. For instance, sections are devoted to obesity, lack of exercise, the glycosuria deficiencies and diagnosis, errors in the interpretation and performance of blood sugar tests and diagnosis. Obviously, it could be argued that every important fact about diabetes is in some way related to trauma; but this is not a textbook of facts about diabetes.

Studies in Haemolytic Streptococcus Fibrinolysin, Antifibrinolysin and Antistreptolysin, with Particular Reference to Rheumatic Fever. By Sten Winblad. Acta pathologica et microbiologica Scandinavica Supplementum XLIV. Paper. Pp. 229, with 13 illustrations. Copenhagen: Ejnar Munksgaard, 1941.

This monograph contains a detailed and careful review of classification and antigenic properties of the streptococci, and numerous personal observations on fibrinolysis, antifibrinolysis and antistreptolysis. The work was carried out at the University of Lund, Sweden, from which other authors, connected with Dr. Winblad, have presented important contributions to the study of rheumatic fever. Therefore especial attention is directed to the significance of variations in titer of antifibrinolysin and antistreptolysin for the etiologic problem of rheumatic fever. In rheumatic fever the titer of both these antibodies rises to the level observed in other streptococcic diseases. The titer rises during the first weeks of the disease even if no accompanying or preceding streptococcic infection can be traced, and it slowly returns to normal, though it remains elevated longer than the sedimentation rate. In the interpretation of his data the author asks himself whether the occurrence of an elevated antibody titer against an organism justifies the opinion that the disease is due to that specific agent. The answer is obviously negative. He indicates that other evidence is necessary, such as "the direct isolation of the specific causative organism in the patient's blood, tissues, or excreta." The theory that rheumatic fever represents the allergic response of some individuals to streptococci might explain the difficulty encountered in the demonstration of the presence of this organism in the affected tissues. The author warns, however, that it must not be construed that the high antifibrinolysin and antistreptolysin titer implies the presence of an allergy to streptococci, because genuine allergy is shown only by the tissue reaction against the antigen, and not by the presence of humoral antibodies. Furthermore, the author observed that the rise of antibody titer may occur either before or after the onset of the rheumatic attack. This last observation differs from the observations reported by some American authors and should be confirmed independently. The work presented here does not, and could not, arrive at a conclusion as to the probable etiology of rheumatic fever. It is the impression of the author that his findings agree with, but do not prove, the allergic streptococcus theory. The reviewer feels, however, that the same findings agree as well with the theory of a virus etiology in which the streptococcus plays the role of the most frequent, but not exclusive, activating or associated organism. The present monograph will be valuable to all those engaged in research in the etiology of rheumatic fever, because of the personal observations and because of the rich literature (three hundred and seventy references), including some not easily accessible important work by Scandinavian authors.

Das Schichtbild der Lunge des Tracheobronchialbaums und des Kehlkopfes. Von Kurt Greineder, Dozent für Röntgenologie an der Universität Berlin. Cloth. Price, 37.30 marks. Pp. 250, with 509 illustrations. Leipzig: Georg Thieme, 1941.

This is an elaborate presentation of the subject of body section roentgenography as applied to the upper air passages. After a chapter setting forth in adequate detail with text and geometric drawings the theory of laminagraphy, also sometimes called planigraphy or tomography, the author proceeds to the discussion of technic as applied to the lungs, the findings in the normal lung, bronchial diseases, nonspecific inflammatory diseases of the lung, lung abscess, differential diagnosis of lung abscess and empyema, foreign bodies, and a long chapter of more than forty pages on lung tumors and bronchial obstructions. Tuberculosis and pneumoconiosis are assigned about seventy-five pages. The remainder of the book is devoted to the trachea and to the larynx.

The illustrations are especially numerous and serve admirably to illustrate the author's contention that there are many lesions of the lung in which tomographic demonstration is much more convincing than the single film and often shows up lesions which cannot be otherwise demonstrated on the x-ray film even when made stereoscopically.

The expense of an instrument especially planned for body section roentgenography is as yet prohibitive for private practice and for many hospitals and clinics, but a fairly efficient equipment can be attached to many of the existing types of radiographic tables which will give valuable help in a certain limited class of cases. In addition to the installation expense, one must consider the additional expense of multiple films necessary for the various sections to procure a film portraying the exact section needed for the study of the part, and also the fact that even in the section under study only a limited field, corresponding roughly to less than an 8 by 10 inch film, can be demonstrated with satisfactory detail.

Polarography: Polarographic Analysis and Voltammetry Amperometric Titrations. By I. M. Kolthoff, Professor and Head of Division of Analytical Chemistry, University of Minnesota, Minneapolis, and J. J. Lingane, Instructor in Chemistry, University of California, Berkeley. Cloth. Price, $6. Pp. 510, with 141 illustrations. New York: Interscience Publishers, Inc., 1941.

Polarographic or voltammetric analysis was invented about twenty years ago by Jaroslav Heyrovsky, and its subsequent development is largely attributable to his efforts. Its use in analytic chemistry and other fields is due to the fact that when a solution of an electrolye is electrolyzed in a cell consisting of a dropping mercury electrode and a nonpolarizable electrode it is possible to determine from the resulting current-voltage curve both the nature and the concentration of the reducible or oxidizable substance present. Thus it lends itself to the qualitative and quantitative determination of many inorganic and organic substances and radicals. About 400 journal articles have appeared on the subject of polarography, but this is the first monograph on this subject in English. The eight parts include an introduction, discussion of the many theoretical principles involved, apparatus, inorganic and organic analysis, biologic applications, use of platinum electrodes and amperometric titrations. The appendix includes a list of substances with their respective half-wave potentials in various electrolytes. This appendix is invaluable to any one who contemplates work with a polarograph. The bibliography, indexing and

illustrations are all excellent. This monograph makes available the theoretical and practical aspects of a subject which is rapidly becoming popular with analysts. Literature contributions are summarized and an attempt is made to explain discrepancies in reported results. It should be available in every laboratory possessing a polarograph and to every person interested in the subject.

Abdominal Surgery. By John E. Hammett, M.D., F.A.C.S., Professor of Surgery, The New York Polyclinic Medical School and Hospital, New York. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 356. New York, Toronto & London: Oxford University Press, 1941.

Thoracic Surgery. By Charles W. Lester, A.B., M.D., F.A.C.S., Assistant Clinical Professor of Surgery, New York University, New York. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 141. New York, Toronto & London: Oxford University Press, 1941.

Fractures and Dislocations. By Kenneth M. Lewis, B.S., M.D., F.A.C.S., Assistant Clinical Professor of Surgery, New York University College of Medicine, New York. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 217. New York, Toronto & London: Oxford University Press, 1941.

Histology and Embryology. By José F. Nonidez, Sc.D., Professor of Anatomy, Cornell University Medical College, N. Y. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 199. New York, Toronto & London: Oxford University Press, 1941.

Diseases of the Respiratory Tract. By Jacob Segal, M.D., F.A.C.P., F.A.C.C.P., Attending Physician, Riverside Hospital, New York. Foreword by Harry Wessler, M.D., Director of Medical Service, Bronx Hospital, New York. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 172. New York, Toronto & London: Oxford University Press, 1941.

Obstetrics. By Hervey Clock Williamson, M.D., F.A.C.S., Associate Clinical Professor of Obstetrics and Gynecology, Cornell University Medical College, New York, and George Schaefer, M.D., Assistant Attending Surgeon in Gynecology Clinic, St. Luke's Hospital, New York. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 113. New York, Toronto & London: Oxford University Press, 1941.

Surgery of Head and Neck. By Arthur S. McQuillan, A.B., M.D., F.A.C.S., Clinical Professor of Surgery, New York University Medical College, New York. Oxford Medical Outline Series. Cloth. Price, $2. Pp. 138. New York, Toronto & London: Oxford University Press, 1941.

Each of the books in this series is in outline form. Each disease or condition is discussed under etiology, pathology, diagnosis, treatment and prognosis; this arrangement, of course, is not followed in the book on histology and embryology. Obviously the outline method has serious limitations and cannot be considered sufficiently detailed to serve as an adequate guide to diagnosis and treatment. It would seem that these books would have their greatest usefulness in assisting preparation for some of the various types of examinations with which physicians are so commonly confronted.

The Vitamin Content of Meat. By Harry A. Waisman, Ph.D., Research Associate in Biochemistry, University of Wisconsin, Madison, and C. A. Elvehjem, Ph.D., Professor of Biochemistry, University of Wisconsin. Boards. Price, $3. Pp. 210. Minneapolis: Burgess Publishing Co., 1941.

The intensive research on the nutritive value of meat carried on at the University of Wisconsin during the past few years has logically culminated in the publication of this book, which combines the results of these original investigations with a comprehensive review of the literature. Dietitians will be interested in the tables giving the nutritive values of several cuts of meat and in the vitamin losses observed as the result of the cooking methods used in preparing these cuts for the table. The critical review of assay methods and comparison of the results obtained by various methods employed in vitamin assays will be valuable to those interested in determining the vitamin content of foodstuffs. Also of great value is the comprehensive bibliography on the chemistry, physiology, pathology, assay methods and therapeutics of the various vitamins.

A Manual of Bandaging, Strapping and Splinting. By Augustus Thorndike Jr., M.D., F.A.C.S., Associate in Surgery, Harvard Medical School, Boston. Paper. Price, $1.50. Pp. 144, with 117 illustrations. Philadelphia: Lea & Febiger, 1941.

Although intended primarily for medical students, nurses and orderlies, this handy size paper covered volume is highly recommended to practicing physicians. The book follows the general course given in the department of surgery at Harvard Medical School to second year students. The author presents and describes the technic of the use of dressings, bandages, adhesive plaster and splinting material. In the foreword Elliot Cutler says that "surgeons, like musicians, take pride in their tools and in the performance of their tasks." The illustrations are the meat of the manual and visualize to the beginner the steps which must be taken to let the young surgeon remember that a neat dressing often bespeaks a good job beneath. The student will soon learn that the principles of support and immobilization entail fundamental concepts in the proper care of injury and infection. Cutler says that especially is this book valuable because of the imminence of worldwide hostilities. The book contains descriptions and illustrations of the dry sterile dressings for clean wounds, septic wound dressings, the treatment for strains, sprains and contusions, dislocations and emergency splinting, the transportation of fracture cases, plaster of paris and similar bandages.

Surgical Diseases of the Spinal Cord, Membranes, and Nerve Roots: Symptoms, Diagnosis and Treatment. By Charles A. Elsberg, M.D., Consulting Surgeon, Mount Sinai Hospital, New York City. With Chapters by Cornelius G. Dyke, M.D., Associate Professor of Radiology, College of Physicians and Surgeons, Columbia University, and Abner Wolf, M.D., Assistant Professor of Neuropathology, College of Physicians and Surgeons, Columbia University. Cloth. Price, $14. Pp. 598, with 249 illustrations. New York: Paul B. Hoeber, Inc., 1941.

In 1916 Elsberg wrote "Diseases of the Spinal Cord" and in 1925 "Tumors of the Spinal Cord." The present volume is a modern version of both his previous works. Elsberg has been a pioneer in neurologic surgery, particularly specializing in surgery of the spinal cord. From his initial endeavors much of our present surgical technic has arisen as well as considerable knowledge of diagnosis and localization. In this volume Dyke discusses the roentgenologic aspects and Wolf the pathology. The result is an authentic statement of the subject well documented and derived from seasoned experience. The book is beautifully written and well illustrated and should be in every neurologist's library.

The Elegant Eighties When Chicago Was Young. By Herma Clark. With a foreword by John T. McCutcheon. Cloth. Price, $7.50. Pp. 258, with 36 illustrations. Chicago: A. C. McClurg & Co., 1941.

This book offers a fictitious correspondence between two women who lived in Chicago in the 1880's. That was a period in which medicine in Chicago had many interests. The chapters devoted to 1883 tell the story of Dr. Mary H. Thompson and the Women's and Children's Hospital, where Dr. Sarah Hackett Stevenson began her great career. One hears of the introduction of consumption cures and magnetic belts. The book is made interesting with wonderful reproductions of the personalities who were important in the Chicago of the 1880's. It is beautifully printed and is certain to be a delight to every one who has a taste for the qualities of the more quiet existence of the 1880's. Here too is the story of the founding of the Newberry Library, of the drama and particularly of the interesting society of that period.

Manual for Medical Records Librarians. By Edna K. Huffman, R.R.L., Director, School for Medical Records Librarians, Grant Hospital, Chicago. Cloth. Price, $3. Pp. 308, with illustrations. Chicago: Physicians' Record Company, 1941.

In this manual, record librarians are given a brief history of medical records and an analysis of the use and value of the medical records and procedures in the medical records department such as organization and management, storage and cross indexing. Qualifications and training of the medical records librarian are discussed and certain of the so-called secondary duties of medical records librarians. There is little doubt that a book of this kind is needed, but it is the reviewer's belief that a considerable amount of obsolete material is included and that somewhat greater emphasis should be given toward the more modern methods and less space occupied in describing those procedures which can no longer be considered up to date.

An Introduction to Medical Science. By William Boyd, M.D., M.R.C.P., F.R.C.P., Professor of Pathology and Bacteriology in the University of Toronto, Toronto. Second edition. Cloth. Price, $3.50. Pp. 358, with 124 illustrations. Philadelphia: Lea & Febiger, 1941.

This is a volume for orientation, planned primarily to explain to the nurse causes of disease and the bodily changes that occur. When one is able to survey the picture as a whole, individual sections become more clear. The style is simple, direct and understandable by any person of late high school or college education. The book may well be recommended to the general reader as well as to the nurse.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

WEIGHT REDUCTION

To the Editor:—**In October 1938 in the *Journal of the Missouri Medical Association*, Werner and Weir published an article on the treatment of obesity in adults. They studied 77 patients; 76 were women, and 75 had obesity of the pituitary type. For the past three months I have been using their method on 6 patients who did not respond to diet alone. (Werner and Weir advocated a diet of about 1,500 calories, the giving of 1 cc. of solution of posterior pituitary intramuscularly twice a week and administration of desiccated thyroid, 1 grain [0.06 Gm.] three times a day.) My results have been surprisingly good. However, this is what is worrying me: Do you believe the patients will regain their former weight when the administration of solution of posterior pituitary is discontinued? Of course I intend keeping them on the low caloric diet.**

M.D., New York.

ANSWER.—The article by Werner and Weir to which reference is made does not contain any evidence that the injection of 1 cc. of solution of posterior pituitary intramuscularly twice a week contributed toward the weight reduction of their patients. The use of solution of posterior pituitary by these authors was based merely on inference from the previous work of Raab; their simultaneous use of thyroid and low caloric diets may easily account for the losses of weight which occurred. It is, therefore, most probable that the discontinuation of the use of solution of posterior pituitary will make no difference, providing one continues with the rest of the treatment. However, if it is intended to discontinue the use of thyroid, it is likely that the patients will regain their former weight. For, since they did not respond to dietary treatment alone, it is apparent that they were not ingesting the prescribed diet and, therefore, are still eating sufficient food to maintain their high weight when the metabolic rate is not speeded up by thyroid.

This illustrates the fallacy of weight reduction by medication, unless the patient presents a type of obesity (such as the relatively rare, true hypothyroid obesity) for which thyroid may be prescribed and continued indefinitely. The essence of good treatment for a permanent result in the usual type of obesity is to teach the patient a new and better food habit to replace the previous faulty food habit.

STERILIZATION AND CARE OF HYPODERMIC EQUIPMENT

To the Editor:—**How long will rustless needles (for injection purposes) remain sterile without rusting (1) if left in a Castle sterilizer with its lid down for one week or longer, (2) if removed from the sterilizer after boiling for several minutes and then placed in a sterile towel, or (3) if the syringe and rustless needles are wrapped in a dry towel, placed in the sterilizer for sterilization and then removed and allowed to dry and cool? When a physician is called to see a patient, usually in the middle of the night, who is suffering from, say, cardiac asthma, bronchial asthma or severe pain requiring a hypodermic injection of some drug, it is necessary to have a member of the family hunt for a suitable pan or vessel and then to boil the syringe and needle, fill it with water, allow it to come to the boiling point, boil the syringe and needle for five minutes (at least) and then wait another five minutes for the water to cool before removing them from the pan. These procedures will usually require between fifteen and twenty minutes and perhaps longer. Considerable time is accordingly wasted waiting for the syringe and hypodermic needle to be sterilized and ready for the administration of the injection. The question now is How can the syringe and needle be sterilized and kept sterile in order to be ready for instant use when required, whether in one week or several weeks subsequent to their sterilization?**

E. L. Hergert, M.D., Brooklyn.

ANSWER.—Any object which is actually sterilized and so wrapped that it is protected against contamination will remain sterile forever. However, the procedures mentioned in the inquiry are not recommended. The Castle sterilizer does not employ steam under pressure. Boiling water or steam at atmospheric pressure may not sterilize in less than thirty minutes. Either of the following methods should be considered:

(*a*) With needle attached and plunger removed, wrap the syringe in cotton cloth so that it is completely covered by several layers. Place the wrapped syringes on a wire rack at least 2 inches above the water level in a household pressure cooker. Sterilize at 15 pounds steam pressure for twenty to thirty minutes. Turn off the heat and allow the steam pressure to go down. When the pressure is down nearly to zero, open the valve, allow any remaining steam to escape and then open the cooker. The wrapped syringes will be found slightly moist. Place them in a kitchen gas or electric stove oven at moderate heat; they should be dry within five minutes. (A pressure cooker is actually a small autoclave, and small sizes may be bought from kitchenware furnishers for $10 or less.)

(*b*) Many modern gas or electric kitchen stoves have well insulated ovens with thermostatic control. If time allows, there is no better way of sterilizing clean glassware than by dry heat. Glassware is also etched less readily by repeated exposure to dry heat than by steam. Wrap the syringes in cloth as described. Bake them in the oven at about 160 C. (320 F.) for at least two hours.

When wrapped syringes are sterilized by either of these methods, they may be protected from dust and handling by placing them in small paper bags. If they are dry they will remain sterile indefinitely and the needles will not rust, although it is advisable to use "rustless" needles.

DESENSITIZATION TO HORSE DANDER

To the Editor:—**A youth aged 18 has had bronchial asthma since he was an infant. It has been necessary for him to live in Tucson, Ariz., the year round until last summer, which he spent here, because all methods of treatment in Memphis have failed to relieve his asthma while in this city. He attends the state university in Tucson and has been told that they will not admit him for the coming season unless he takes injections of "horse dander" to "immunize" him from this substance, to which he is extremely sensitive. The patient requests that I start these injections. It is my opinion that this would be extremely dangerous because of the severe attacks of asthma which he has had. I would appreciate an opinion regarding the proper procedure in such a case.**

M.D., Tennessee.

ANSWER.—Immunization against horse dander is a routine procedure and is practiced by almost all men who devote special attention to the subject of allergy. There is little danger to the patient, provided suitable precautions are observed.

A scratch test to horse dander should be done first and, if a pseudopod forms (indicating a four plus reaction), the patient is given on another day a series of intradermal tests with weak dilutions including 1:100,000, 1:1,000,000, 1:10,000,000 and 1:100,000,000 with a control. Desensitization should then begin with that dilution which just fails to give a positive reaction. For example, if the reaction to the 1:1,000,000 dilution is 2 plus and the 1:10,000,000 reaction is negative, start the treatment with 0.10 cc. of the 1:10,000,000 extract. Then the patient should receive 0.15 cc., 0.22 cc., 0.30 cc., 0.45 cc., 0.65 cc. and 0.85 cc. of this dilution followed by similar doses of the 1:1,000,000 dilution. This should be followed by similar doses of the 1:100,000, then 1:10,000, then 1:1,000 extracts. When the 1:100 dilution is reached, begin with 0.15 cc. followed by increases of 0.05 cc. each time. These injections should be given twice a week with the following precautions:

The amount should not be increased if the patient has much local reaction; after this type of reaction the dosage should either be repeated or reduced. Epinephrine 1:1,000 should be on hand in case a general reaction occurs; 0.50 cc. to 1 cc. may be given if necessary. The patient should remain in the doctor's office from fifteen to twenty minutes after the injection has been given.

The results of treatment with horse dander extract have, on the whole, been excellent. Patients should at the same time avoid horses and materials which contain horsehair, such as certain mattresses.

The patient, if not already immunized against diphtheria and tetanus, should be given toxoid either singly or combined so that he will be under no danger of a reaction from horse serum (antitoxin), to which he might react violently.

TOXICITY OF DICHLOROBENZENE

To the Editor:—**Can you tell me whether there is danger in the use of dichlorobenzene as a moth exterminant in closets which are frequently opened? Can it be considered one of the benzene carcinogenic chronic irritants?**

Jennette Evans, M.D., Ithaca, N. Y.

ANSWER.—Dichlorobenzene exists in the ortho, meta and para forms. Paradichlorobenzene is used fairly extensively in veterinary therapeutics, in agriculture and for the preservation of furs and clothing. There are few references in scientific literature to paradichlorobenzene, and it is only recently that its toxic possibilities have become of interest. A recent paper by Berliner reports the finding of cataracts following the inhalation of paradichlorobenzene vapor, and experimental investigations have led him to conclude that, when inhaled in sufficient quantities, paradichlorobenzene may produce serious toxic effects in human beings and in animals. He warns that the public, medical profession and health authorities should be made cognizant of the potential dangers. Confinement in a closed space with a high

concentration of this moth repellent may cause deleterious effects, but there is no evidence that occasional short exposures may cause untoward reactions. If a closet or room is not air tight there may be sufficient leakage to endanger nearby inhabitants: Berliner mentions a report describing the severe poisoning of a person who lived above a fur cleaning establishment. Another source of potential danger lies in the solvent sometimes used to dissolve dichlorobenzene for use as a spray. These solvents include such toxic agents as carbon tetrachloride, benzene, chloroform and carbon disulfide. The toxicology of carbon tetrachloride, benzene and carbon disulfide are discussed in a number of pharmacology books and in a textbook by Browning. Present knowledge does not indicate dichlorobenzene as being a carcinogenic agent. A case of dermatitis from orthodichlorobenzene was reported in THE JOURNAL in 1939, and by cutaneous skin tests the patient was subsequently shown to be very sensitive to this form of dichlorobenzene. On the basis of what we now know, it is fair to say in summary that intermittent exposures to the fumes of paradichlorobenzene, as ordinarily used as a moth repellent, is probably not deleterious, but there is reason to fear that prolonged exposure to this group of compounds or exposure to high concentrations may lead to injury. Clinical reports on the dichlorobenzenes are few in number, and in view of their chemical constitution and widespread use under varying conditions they might well be watched carefully.

References:

Browning, E.: The Toxicity of Industrial Organic Solvents, London, His Majesty's Stationery Office, 1937.

Berliner, M. L.: Cataract Following Inhalation of Paradichlorobenzene Vapor, *Arch. Ophth.* **22**: 1023 (Dec.) 1939.

Downing, J. G.: Dermatitis from Orthodichlorobenzene, THE JOURNAL, April 15, 1939, p. 1457.

NEURITIS OF TROCHLEAR NERVE AFTER INFLUENZA

To the Editor:—**Following an attack of influenza a man aged 56 had a paralysis of the trochlear or fourth nerve of the eye. The only symptom is double vision when looking downward. There is a high esophoria in the lower quadrant of about 16 diopters, 8 diopters in the midline and 6 when looking upward. There is normal vision in both eyes for both near and far. The fundus is normal. The Wassermann reaction has been taken and is negative. There is a history of chronic sinusitis with allergy, seasonal hay fever. The antrum on the affected side was washed and considered negative. A roentgenogram shows more involvement of the left ethmoids than on the opposite side. These pictures were taken during the hay fever season. The diagnosis made was paralysis of the left fourth nerve due to ethmoiditis. Multiple sclerosis was considered, but, since there was no symptom with the exception of the paralysis, all other diagnoses were eliminated. The patient can play golf and is not troubled with diplopia at any other time. As stated, the diplopia is present only when the patient is looking extremely downward.**

M.D., Oregon.

ANSWER.—If there are no other signs or objective evidences of organic disease of the central nervous system, the patient probably has a neuritis of the left trochlear nerve. This, no doubt, followed the attack of influenza. To have this nerve involved alone is rare. Usually the ciliary muscle, the sphincter pupillae and the external ocular muscles are also involved. The paralysis may be obstinate in recovering. Thiamine hydrochloride may be given hypodermically in doses of 100 mg. daily for at least three weeks. Large amounts of liver should be eaten. Jello at least once daily should be consumed for its aminoacetic acid content. Ephedrine sulfate, 3/8 grain (0.024 Gm.) twice daily by mouth, should be tried for at least two weeks. The patient should be observed and reexamined at least once a month to determine the presence of other objective evidence of organic disease of the central nervous system.

DETERMINATION OF SPECIFIC GRAVITY OF BLOOD

To the Editor:—**I have been asked for a simple method for determining the specific gravity of blood. This is to be used as an indicator of internal hemorrhage. I know of no accurate method for specific gravity of blood, which could be carried out in a small laboratory, which would be sufficiently sensitive to be of value. Can you tell me of such a method or where I might find it?**

M.D., Oklahoma.

ANSWER.—The specific gravity of whole blood plasma and other body fluids is easily and accurately done by the falling drop method of Barbour and Hamilton. In this procedure the time required for a drop of a test fluid to fall a fixed distance in a mixture of a certain specific gravity is determined. The method is thoroughly described in numerous articles (Bellis, C. J.: A Rapid Method for Determining the Specific Gravity of Body Fluids by the Falling Drop Principle, *J. Lab. & Clin. Med.* **26**:564 [Dec.] 1940).

The measurement of the specific gravity of whole blood has been used to determine internal hemorrhage. The method may reveal relatively small changes in blood volume (Foote, M. N., and Gerst, G. R.: Practical Application of the Falling Drop Method for Determining Surgical Prognosis, *Am. J. Surg.* **50**:316 [Nov.] 1940).

The apparatus for determining the specific gravity of the falling drop method can be obtained from laboratory supply houses.

CONGENITAL MALFORMATION OF OUTER EAR

To the Editor:—**A child 2 days old has a unilateral congenital defect of the ear with absence of the external auditory meatus. The covering of this opening is like the skin elsewhere in the auricle. The entire auricle is present, somewhat smaller and a little more "crumpled" than the right ear, which is entirely normal in all respects. Whether there is a canal behind this closure, I do not know. Should one puncture this membrane with a small caliber needle to determine the presence of an external auditory canal? If so, at what age? Should suspicions of a canal arise, when (age period) and how should this be incised (type of operation)? How frequently is this abnormality encountered? How frequently is a canal found in this condition? Does one find intact hearing apparatus behind such a membrane?**

Eugene Bernstein, M.D., New York.

ANSWER.—Congenital malformations of the outer ear with absence of the external auditory meatus are usually associated with absence of the drum membrane, although in rare instances the inner end of the ear canal may be developed with a drum membrane while the outer end is covered over with skin. A properly taken roentgenogram should help to indicate whether or not there is a normally developed osseous canal. Careful hearing tests with masking will reveal the condition of the hearing and will indicate whether or not the perceptive mechanism is properly developed and will give some indication of the presence or absence of a normal conducting mechanism.

Plastic reconstruction of the external auditory canal rarely results in improvement in hearing, since the drum membrane is usually not developed. Such an operation may be desirable for cosmetic reasons, especially in a boy, but it is best delayed until the age of 10 or later, when the normal development of the osseous external auditory canal is completed, and at this age accurate hearing tests can be secured.

EFFECTS OF SYNTHETIC RESINS

To the Editor:—**A patient works with Plaskon molding compound, which is made by an Ohio company. This is apparently a formaldehyde formula of a plastic. He complains of a dry cough. Can you advise me or refer me to work on the effects of plastics on workers?**

C. Spencer Bond, M.D., Rochelle, Ill.

ANSWER.—Plaskon is a synthetic resin of the urea-formaldehyde type. In its manipulation, and particularly in hot operations, gaseous formaldehyde may be evolved. Toxicity chiefly centers about this gas, although nongaseous constituents or derivatives may act as irritants or sensitizers. Dermatitis is the best known of injurious actions, although cases are infrequent compared to some other plastic resins. Bronchitis and other forms of respiratory tract inflammation have occurred in hot molding work. Formaldehyde is the probable cause. Respiratory action, chemistry and cutaneous injuries respectively are described in the following publications:

Krans, E. W.: Effects of Fumes During the Molding of Certain Types of Plastics, *Indust. Med.* **4**: 10 (Jan.) 1935.

Howald, A. M.: Systematic Study Develops New Resin Molding Compound, *Chemical and Metallurgical Engineering* **38**: 583, 1931.

Schwartz, Louis, and Tulipan, Louis: Occupational Diseases of the Skin, Philadelphia, Lea & Febiger, 1939.

TRAUMA AND DIABETES

To the Editor:—**An infant aged 13½ months contracted diabetes mellitus. I should like to know whether a blow she received on the head six months ago could contribute to the development of the disease. A week before she became ill I gave her the first dose of whooping cough vaccine. A few days later she appeared to have a slight pharyngitis, and this became progressively worse. I put her on sulfanilamide, and the following day I discovered that she had much sugar in the urine.**

Thomas Dechairo, M.D., Westmoreland, Kan.

ANSWER.—A blow on the head may cause glycosuria but, fortunately, does not cause diabetes mellitus. This can be stated definitely for other reasons than the well known absence of diabetes following head injuries in war, athletics, automobile accidents and the many accidents of childhood. To cause diabetes, at least nine tenths of the pancreas must be destroyed.

Joslin, Root, White and Marble (The Treatment of Diabetes Mellitus, ed. 7, Philadelphia, Lea & Febiger, 1940) give a detailed review of trauma and diabetes. The most recent discussion may be found in the second edition of Trauma and Disease (Philadelphia, Lea & Febiger), now in press, by Brahdy and Kahn, in which the chapter on trauma and diabetes was prepared by Joslin and his associates.

Vaccines and the new chemotherapeutic agencies have not been shown to lead to diabetes.